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THE
PATHOLOGY AND TREATMENT OF STRICTURE
OF
THE URETHRA.

THE
PATHOLOGY
AND
TREATMENT OF STRICTURE
OF
THE URETHRA.

BY
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AND
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HAVING for many years, devoted considerable attention to the treatment of Diseases of the Urethra, I venture to submit the following pages, as the result of my practical experience. At the same time, I have availed myself of the writings of most of the leading authors on the subject, and have endeavoured to select therefrom such information, as might add to the utility of the present Work.

My desire is, that the principles which I have laid down, and the modes of proceeding I have inculcated, may at all events assist the younger members of the Profession, in surmounting many difficulties they may encounter in the treatment of Stricture of the Urethra.

While pursuing the investigation of the minute anatomy of the Urethra, with the view of ascertaining more clearly the cause

of the structural alteration, in diseases of these parts, I have to thank Mr. J. T. Quekett, of the Royal College of Surgeons, for some important details on this subject.

It is my intention to persevere in the inquiry into the Anatomy and Pathology of this portion of the human body, with the view of more satisfactorily tracing the diagnosis of disease; which, at a future period, I may venture to submit to the Profession.

JOHN HARRISON.

ALBANY COURT YARD,
London, March 3rd, 1852.

THE
PATHOLOGY AND TREATMENT OF STRICTURE
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SECTION I.

INTRODUCTORY REMARKS RELATIVE TO THE
ANATOMY OF THE PRINCIPAL PARTS
CONCERNED.

THE Urethra may be viewed as the continuation of the neck of the bladder, of which it is the excretory duct, and in its healthy state affords the outlet for the urine and seminal fluids. It is divided by anatomists into three portions:—

1st.—The prostatic, or that part which is surrounded by the prostate gland.

2nd.—The membranous portion, or isthmus of the urethra, which is the narrowest part, is slightly curved, lies underneath the symphysis of the pubis, and is surrounded by the compressor muscle of the urethra.

3rd.—The spongy portion, which is situate along the under surface of the penis, and is encircled by

the *corpus spongiosum urethræ*. Its posterior end is the *bulb*, which is surrounded by a large mass of spongy erectile tissue.

The urethra, throughout its whole length, is lined by a delicate mucous membrane*, which from various circumstances is prone to disease.

* According to *Mr. Quekett*, the urethra is divided into three parts, the prostatic, membranous, and spongy. In the first, or prostatic portion, the mucous membrane at its commencement is smooth, and it then becomes thrown into longitudinal folds which pass in curved lines on either side of the *verumontanum*; in this portion of the canal we have the openings of the prostatic ducts.

In the membranous portion the mucous membrane is again smooth, and very vascular; but immediately on passing the bulb, it diminishes in vascularity and becomes of bluish tinge, resulting from strongly glistening fibres like those of tendon which are here present. The canal is thrown into longitudinal rugæ, which are continued on to within three inches of the glans; from this part, the membrane is more or less villous during the remainder of its course.

The mucous membrane of the entire canal is covered with that variety of epithelium termed the tessellated or scaly; in the spongy part it is in tolerable abundance, but in the membranous it is more sparingly developed; in the prostatic and near the cervix of the bladder the scales become more rounded, and somewhat resemble those of the kind termed spheroidal. There is in most urethræ a *distinct line of demarcation* between the *membranous and spongy portions*, the vessels of the former being very numerous and almost superficial, whilst in the latter they are intimately connected with the fibrous tissue above noticed. The vessels in the grooves of the rugæ of the spongy portion are far more numerous, than those on the convex parts, forming the folds themselves.

The muscles which chiefly concern the surgeon in diseases of the urethra, are the *accelerator urinæ*, and the *compressor urethræ*.

The former surrounds the bulb, and is attached to the perineal fascia, and the *corpora cavernosa* on the one hand, and to the *tunica albuginea penis* on the other.

The *compressor urethræ* surrounds, as already mentioned, the membranous part of the urethra, and consists of a superior layer lying over this part; an inferior situate underneath, and an internal or circular enveloping the same.

Mr. Wilson has described its fibres as forming a kind of sling round the urethra:—This muscle is attached on the one hand to the descending ramus of the pubis, on the other to the membranous and prostatic portions of the urethra. Its fibres are immediately brought into view on removing the anterior ligament of the bladder. It tends to draw the membranous part upwards, and thus diminish the area of the urethra.

In connexion with these might be noticed the *levator ani* muscle, the anterior fibres of which merge into or are blended with those of the *compressor urethræ*, and also the *sphincter externus ani* which is in part attached to the *accelerator urinæ* muscle.

Some writers have laid great stress on the admeasurement of the different portions of the canal. Yet, if we take into account the many

circumstances which tend to modify both its length and calibre, from its commencement at the orifice of the bladder, to its termination at the external meatus ; and the fact moreover that these vary in different individuals, and undergo material changes as age creeps on, we must conclude that no specific or definite admeasurements can be assigned which shall be worthy of reliance. For practical purposes, it is alone desirable that the surgeon possess a thorough knowledge of the anatomical relations of the parts above named. With all this, it must be kept in mind, that in treating disease he must expect to find parts more or less out of their natural place, and be prepared to act accordingly.

Next in order of importance is the arrangement of the veins. The *vena magna ipsius penis* is seen lying on the *dorsum penis*, and just before it passes under the pubic arch, divides into numerous capacious tortuous branches ; many of these are as large or even larger than a crow-quill. These veins are in contact with the upper part and sides of the membranous portion of the urethra ; they pass into the pelvis and form the prostatic plexus. These veins pass through apertures in Wilson's muscle, and must be more or less influenced by the contraction of its fibres.

All the blood from the *glans penis*, the *corpus spongiosum*, and the bulb, is returned by the *vena magna ipsius penis* and its branches, which, as just

stated, are liable to be controlled by the compressor muscle of the urethra.

On the other hand, the blood from the *corpora cavernosa*, is returned by branches which accompany the arteries of the corpora cavernosa, and which discharge their contents into the internal pudic vein. Therefore, as far as regards the veins, the *corpus cavernosum* is nowise influenced by the compressor muscle of the urethra.

In the Museum of Guy's Hospital, I had an opportunity of examining a fine injected preparation, made, I believe, by the late Sir A. Cooper, which exhibits the vast venous arrangement, adjunct to the membranous part of the urethra.

We thus see, that the venous blood from the urethral portion of the penis, is conveyed by one channel, and that from the cavernous by another. Were it otherwise, or rather were it not for the outlet by the internal pudic vein, there would be constant risk from over-distension or even rupture of the walls. This would therefore appear to be, a salutary provision of nature, against any stress upon the vessels from undue muscular contraction.

Dr. Béniqué* has especially directed attention to the mode in which the circulation is carried on in the penis. He contends that, during erection, there is a turgescence both of the spongy and cavernous portions, in consequence of muscular compression; but that either may experience erection

* De la Rétention d'Urine. Paris 1838.

separately, on account of the two-fold venous arrangement. It is however, presumed, that erection will be less marked in the spongy, than in the cavernous portion, for in the former, the helicine arteries first described by Professor Müller are comparatively scanty.

SECTION II.

SPASMODIC VARIABLE STRICTURE.

The next point for consideration is one of great importance:—It is the corollary of what has been already enunciated. If from any cause, an irregular contraction of the muscular structure of the urethra, in other words spasm, supervene, it is obvious that it must prevent the return of the venous blood, without interfering with the ingress of the arterial.

The result will be congestion of the vessels, which will continue so long as there is muscular contraction. Now, the immediate effect of congestion here, is to modify to a remarkable degree the calibre of the canal of the urethra, so as to impede or obstruct the flow of urine.—This form of spasmodic contraction, is not of very frequent occurrence, and some writers doubt, whether it can ever assail, a part of the urethra which is quite sound.

The circumstances which are supposed to afford evidence of this the spasmodic stricture, are, according to Mr. Syme, the sudden invasion and disappearance of the complaint, its connexion with

mental agitation, and the difficulty which the surgeon experiences in introducing a catheter.

Some anatomists have believed, that spasmodic stricture depends, on contraction of the muscular fibres, which enter into the composition of the urethra ; but it seems highly improbable, that the microscopic fibrils of Köelliker, can ever prove a determining cause ;—others again, ascribe it to the erectile texture which immediately invests its outer surface, and this, because the disorder in question, is almost entirely confined to persons of an irritable nervous temperament.

The most satisfactory explanation, I conceive, however, is that previously alluded to, which refers it to the turgescence of the lining membrane, the sequel of venous congestion from irregular contraction of the muscles, and more especially of that of the compressor muscle of the urethra.

In some instances the spasm may assail the *accelerator urinæ* muscle, and induce compression of the *corpus spongiosum*, whereby the return of venous blood is checked, whilst on the other hand, the artery of the bulb, being exempt from pressure, owing to the depth at which it lies, and to the impulse with which the blood is conveyed into it, will continue to pour its contents into the *corpus spongiosum*. The effect of which, must be spasmodic stricture at the bulb.

According to Dr. Béniqué, one can verify this by a very simple experiment on a dead body. “ In-

“ ject,” he says, “ the *corpus spongiosum*, after
“ having introduced a bougie into the urethra.
“ The greater the force with which you push the
“ piston of the syringe, the more trouble will you
“ experience in advancing or withdrawing the
“ small bougie. If you suspend the pressure, the
“ spongy texture will empty itself in virtue of its
“ elasticity, and the mere weight of the bougie will
“ suffice to expel it from the canal*.”

The parts of the urethra most prone to this kind of stricture, are as a general rule, the membranous or muscular portion, and the bulb or its vicinity; depending in the former case, on contraction of the *compressor urethræ* muscle; in the latter, on contraction of the *accelerator urinæ*, or so called bulbo-cavernous muscle.

Where the stricture is at the junction of the membranous part with the bulb, as is frequently the case, it may then be due to irregular contraction of both the above muscles, in whole or in part.

The following case, is one, in which I believe the affection originated, in the muscular and venous structures external to the canal.—A gentleman from the country, aged forty years, consulted me on the 4th of June, 1851.—He suffered from incontinence of urine, night and day, with frequent involuntary attacks of straining to relieve the bladder, which however were ineffectual, for the urine only dribbled away, attended with severe

* Op. cit., p. 160.

pain in the region of the bladder, which caused him to bend double. He found the stream of urine begin to diminish about two years previously, and gradually get smaller and smaller. He has been in the state above described for about twelve months, but within the last three months, the pain at the neck of the bladder has been on the increase. When I saw him, no silver instrument could be passed through the membranous part of the urethra, but I succeeded after a few attempts, with a flexible gum catheter, in evacuating from the bladder a chamber-potful of urine. The catheter was introduced night and morning for the four following days, and afterwards once daily for a few days, when he was able to empty his bladder naturally and in a full stream.

In the year 1838, I was requested to see a medical man, twenty-six years of age, labouring under fever with violent delirium, which had been preceded by coma, and who had not voided any urine for thirty hours. I found the bladder distended with liquid, so as to form a prominent swelling at the lower part of the abdomen. Attempts had been made, before my arrival, to pass the catheter, but without effect; and some violence seemed to have been used, for there was bleeding from the urethra, and the patient's linen was stained with blood. I was told there must be a stricture, because the medical attendant had tried to pass various instruments, and could not get them beyond

a certain distance, namely, the membranous part of the urethra. There was no evidence, however, of his having at any former period complained of any difficulty of the kind. It was desirable that the bladder, owing to its distended state, should be emptied without loss of time. I tried to pass a moderate-sized catheter, but as soon as it entered the orifice of the urethra a strong tendency to spasm was evinced; and it could not be got beyond the posterior part of the urethra in consequence. Indeed, the whole extent of the urethra was in a state of spasm, as was clearly shown by the manner in which the instrument was grasped. After waiting a reasonable time, during which the patient was tossing about, the catheter was withdrawn, but no urine followed.

I regarded the case as one of mere spasmodic contraction, in which the parts had been rendered preternaturally irritable by the previous fruitless efforts to pass the catheter; I therefore deemed it expedient to allow the patient to remain quiet awhile. In the course of four hours I again visited him, and, finding the irritability of the urethra had subsided, introduced a moderate sized catheter without the least difficulty, and drew off a large quantity of urine.

The bladder in this case had lost its tone from over-distension, depending on the stoppage of the canal from spasm; on two other occasions during the month, he had a recurrence of the affection, requiring the aid of the catheter.

The following may be adduced as a case of obstruction, occurring at the membranous part of the urethra, in consequence of simple muscular contraction, in union with venous congestion; in which there was no real stricture, but which was followed by loss of muscular power of the bladder from over-distension.

A gentleman, aged thirty-five, consulted me in 1847. For some months previously, he had experienced much difficulty and straining in passing his urine, after getting out of bed in the morning, and had been troubled with partial erections. A small catheter was passed, and about twenty ounces of urine were drawn off. Soon afterwards a No. 10 catheter could be introduced with ease. I recommended him to continue its use.

Contrary to advice, he neglected to pursue the treatment, and, being called some distance into the country, was seized with retention of urine. He returned to town—a moderate sized catheter was passed, and a large quantity of urine evacuated. After this, he required the daily use of the catheter during twelve months, before he regained the power over his bladder.

For the notes of a case exemplifying pure muscular spasmodic stricture, I am indebted to Mr. Keate:—"A captain in the army, on coming home
" to his quarters at Windsor, feeling unable to pass
" his urine, from a spasmodic affection of the ure-
" thra, to which he had been frequently subject, and
" having no bougie, he softened in warm water,

“ and rolled out the length, he thinks, of fifteen
“ inches, a piece of black sealing-wax, and readily
“ introduced this into the bladder. He had done
“ the same thing on one former occasion with impu-
“ nity with red wax, after dining with his mess
“ whilst in Ireland.

“ On attempting to withdraw this bougie, about
“ an inch and a half came away. After various
“ attempts on his own part to press forward the re-
“ mainder, he sent for his regimental surgeon and a
“ surgeon of the town, who could not detect the
“ wax in the spongy portion of the urethra; and,
“ after a night of great anxiety and distress, he came
“ to town twenty-two miles, in a post-chaise, and
“ called on me about half-past eight A.M. I could
“ not detect, by external examination, any foreign
“ body in the urethra. I desired him, therefore,
“ to make water, as he thought his bladder was
“ full. This he did in a very full stream, which
“ was suddenly stopped, as happens from calculus
“ in the bladder.

“ This convinced me that the wax had receded
“ wholly into the bladder, and I passed a bougie
“ cautiously, which met not the slightest obstruc-
“ tion in its passage through the urethra. There
“ was nothing, therefore, to justify an incision into
“ any portion of it, and I intimated to him the
“ necessity that would arise for the lateral opera-
“ tion, as for lithotomy.”

Mr. Keate made several attempts with forceps to

withdraw the wax, but in vain ; and as the patient was suffering from most of the symptoms of stone, and desirous of having the lateral operation performed, it was accordingly done by Mr. Keate, with his well-known dexterity. The patient made a good recovery.

The subject of this case, had been liable to frequent attacks no doubt of spasm of the compressor muscle of the urethra, which had yielded to the simple pressure of a bougie ; of course there was no permanent stricture.

On account of the rapid invasion, and no less sudden disappearance of this affection, characterised by alternate relaxation and coarctation of the canal of the urethra ; I have designated it the *Spasmodic Variable Stricture*. This may arise independently of any organic change in the textures of the urethra, a fact which is frequently verified by cadaveric inspection.

Any source of irritation in the urethra may bring it on. I have known it assume, so to speak, a chronic type in individuals who have suffered from protracted indigestion ; more especially in those who have failed to employ suitable remedial measures for the relief of such ailment. In these, the functions of the primary and secondary assimilation get materially disordered, the mucous membranes become sympathetically affected, and an acrid fluid is generated, which acts as an irritant to the delicate and susceptible surfaces along which it

passes. It is not unlikely that in aggravated cases of this description, there may ensue, more or less erosion of the epithelial lining in points of the genito-urinary track, analogous to that which occurs in aphtha, and which may eventually disappear. The abundance of epithelium, lining the mucous membrane at the parts indicated, would seem to bear out this opinion.

Persons constitutionally disposed to gout, or rheumatism, who are much troubled with flatulence and acidity of stomach, accompanied with deranged biliary secretion, are, not unfrequently prone to attacks of slight difficulty in voiding urine, together with pain or uneasiness in and about the urethra. These symptoms may last for a day or so, and then pass off, and recur again after awhile. At the onset, they are generally unheeded; and it is not until they become more frequent, and the painful sensations attendant on them more aggravated, that the patient is led to apply for medical relief. An attack of retention of urine may perhaps be the first circumstance to cause alarm, and justly so, because, if not relieved, the consequences may be serious.

In the treatment of the spasmodic variable stricture, the practitioner must pay minute attention to the state of the constitution. Spasm is often connected with some internal affection. According to Mr. Wardrop, it is frequently associated with disturbed action of the heart; hence, whenever

purely spasmodic stricture, occurs in gouty or rheumatic subjects, the condition of that important organ ought to be carefully scrutinized; and if it be at fault, appropriate means used for setting it aright.

Should the functions of the stomach be deranged, as is often the case, the patient ought to be restrained to a bland diet, and have recourse to such corrective medicines as shall be deemed expedient. As a general rule, he ought to abstain from the use of fermented liquors, taking moderate exercise in the open air, and keeping the cutaneous surface in a healthy state by means of ablution or bathing.

Should the spasmodic variable stricture be referable to piles, then such remedies are indicated, as shall serve to abate, or remove, the hemorrhoidal congestion.

As regards the local treatment, little else can be done than patiently abide the issue.—If the presence of a bougie catheter, (an instrument which I shall hereafter describe,) in the canal, is not productive of any inconvenience, it may be kept in contact with the obstacle, so that advantage may be taken of every intermission of the contraction, in order to advance it in its onward course. This procedure applies only to the instance of urgent retention. The indiscriminate use of instruments here cannot be too severely censured; in proof of which, I might cite the following case:—

A cavalry officer, aged forty-six, subject to here-

ditary gout, much addicted to pleasure, came under my care about seven years ago. He had been given to understand, by a surgeon of repute, that he had a stricture in the urethra. I saw him only a few days after this, and had no difficulty in passing a full-sized instrument into the bladder. I prescribed for him constitutional treatment, including colchicum with taraxacum, by which he was benefited. Subjoined is his own narrative:—

“ In 1830, Mr. ——— passed the first catheter for
“ me without difficulty. In 1832, I had a violent
“ gonorrhœa, attended by a retention of urine.
“ Under the latter I suffered for a fortnight, and
“ may say, from that period to within the last few
“ years, I had a constant slight discharge. Attacks
“ of retention of urine were renewed at different
“ periods, and it was only when I saw the difficulty
“ that almost every surgeon had in passing instru-
“ ments, that I resolved to be my own operator,
“ and discovered that when I could not pass a
“ No. 5 wax instrument, I have been able to pass
“ a No. 12 metallic instrument, without any diffi-
“ culty or pain; and I have now for four years
“ been free from all retention of urine or desire of
“ constantly making water, which used to be most
“ distressing. I may add, that the very first
“ surgeons have put me to the greatest pain in
“ passing instruments, and sometimes not suc-
“ ceeded, though much blood has passed after-
“ wards.”

Mr. Samuel Cooper advises plunging the *glans penis* into cold water, for the purpose of allaying spasm of the urethra. The rapid success of this treatment would go to prove that spasmodic stricture of the anterior part of the urethra, at all events, results from simple mechanical congestion of the spongy texture.

I have made no mention of opium, but am, nevertheless, of opinion that there are certain cases in which this drug is of decided utility, provided it agree with the patient.

SECTION III.

ORGANIC, OR PERMANENT STRICTURE.

By this is meant any continued narrowing or contraction of the canal of the urethra.

Stricture may assail any part of the urethra, except the prostatic, but is most commonly met with in its membranous portion, and which may be partially or wholly implicated.

The situation where it next most frequently occurs, is at the anterior part of the bulb, and, finally, about an inch or so forwards. There are seldom more than two strictures in the same person. Mons. Leroy d'Etiolles, however, mentions his having met with no less than eleven in the instance of a young Sicilian.

Causes and Nature of this form of Stricture.

Stricture may, as a general rule, be traced to inflammation of the mucous membrane of the urethra, and to its most ordinary form, namely, gonorrhœa. It may, however, be caused by blows on the perineum, destruction of the lower wall of

the urethra by abscess, or laceration of the urethra with loss of substance, occasioned by falling from a height; and here it may not supervene till long after the injury;—it is an occasional sequel of lithotomy.

Some writers have believed, that it may originate in too frequent sexual intercourse, or in prolonged erections from repeatedly toying with women; others, but without good reason, in the use of astringent injections.

Gonorrhœa is undoubtedly the most prolific source of stricture. Gonorrhœa, as Rokitansky has shown, is usually confined to one or more spots of the urethra; not only is the *fossa navicularis* implicated, but not uncommonly that part of the surface extending to the prostatic portion; most frequently it is in the vicinity of the bulb.

In instances of very intense and obstinate gonorrhœa, we find in the above localities, a knotty swelling of the urethra, a proof that the *corpus spongiosum* has been affected, and that the product of inflammation, namely, fibrinous exudation, has been there deposited.

A frequent sequel, of gonorrhœa which has been improperly treated, according to this distinguished pathologist, is thickening and hypertrophy of the submucous cellular tissue—coalescence with the mucous membrane, and conversion of the cells of the *corpus spongiosum* to a white resistant callous substance. This transformation may be traced some-

times along the whole extent of the urethra ; frequently, however, it implicates only isolated portions, corresponding to the inflamed points, and thereby gives rise to partial contraction or strictures of the urethra.

The stricture appears in a variety of forms ; sometimes of several lines in length, the walls callous, thickened and smooth, or else uneven, and having the shape of knotty elevations or, of long folds.

In other cases, the stricture is annular, surrounding the whole canal ; or merely a roundish prominence confined to a segment of its area ; or it may resemble a bridle, or an irregular induration, with the mucous membrane puckered round it.

I had an opportunity recently of examining, with the aid of the microscope, the adventitious texture obtained from two preparations of stricture, where the disease had been of long standing. These were as perfect specimens as could be desired. One of them formed almost a perfect *septum* or barrier across the canal, similar to that represented in the plate in Mr. Hunter's work. A minute portion removed from the centre of the stricture, and placed in the field of the microscope, was found to consist of a dense compact fibrous structure, while portions taken from nearer the walls of the urethra, presented a less dense and less compact structure. The structure was analogous to that of old adhesions which are met with elsewhere, consisting originally of

effused lymph, which had become organized, and was ultimately transformed into a dense fibrous mass.

It is satisfactory to find, that Mons. Cruveilhier takes the same view as to the nature of stricture. The fibrous form is, according to him, the most frequent; indeed, he has never met with any other. There is complete disappearance of the mucous membrane at the level of the stricture, and more or less obliteration of the spongy tissue of the urethra. He believes it may originate in two ways:—

1st.—In chronic inflammation of the mucous membrane.

2nd.—In ulceration.

He is disposed, however, to attribute the pathological change more generally to ulceration, and recognises two varieties; namely, the *superficial*, which is confined to the mucous membrane; and the *deep*, in which the whole thickness of the walls of the urethra, is converted into fibrous substance. The amount of stricture being due to the extent of cicatrice, and which will necessarily depend, on the depth to which the ulcer has gone.

Rokitansky* affirms, that clap inflammation passes into ulceration, for he has met with it in cadaveric inspection. Such being the fact, we can readily understand, that even a small eroded point of the mucous membrane, will induce more or less irritation. This by reflex action, will extend to the

* Op. cit.

adjunct muscular fibres, which will be called into undue contraction, and thus occasion a delay in the return of the venous blood. The muscles chiefly implicated here, are the *compressor urethræ*, and some of the fibres of the *levator ani*. By reiteration of the process, venous congestion will be superinduced. That state in which there is, as Mr. Wharton Jones has shown*, an unusual accumulation of red corpuscles in the blood of the affected vessels, and which, if unchecked, will merge into inflammation, and thus further those organic changes which end in stricture.

I solicit the attention of my professional brethren, to a consideration of these two points, namely, the muscular contraction on the one hand, and the venous retardation on the other ; from a conviction, that they perform a material part in the development and progress of stricture. Mr. Pott, in his MS. Lectures, notices particularly, preternatural distension of the vessels of the *corpus spongiosum urethræ*, (he, of course, alludes to the submucous veins,) as a cause of urethral obstruction: and I recollect Sir Everard Home, in the lectures which he delivered in the board room of the old St. George's Hospital, dwelling strongly on the influence which the *compressor urethræ* muscle exercised in the production of stricture, from its being unduly called into action in persons given to libertine practices.

* Guy's Hospital Report, Vol. VII.

Stricture is seldom met with before the period of early manhood, except where it has proceeded from local injury. It would seem to have a special predisposition for certain individuals, particularly those of a strumous habit of body ; hence we may account for its being sometimes hereditary, or occurring in one member of a family after another. Children that wet their bed, and when they grow older void urine oftener than natural, and in a comparatively small stream, are not unfrequently subject in after life to stricture. I have recently been treating a man with a very intractable form of stricture, who told me, that as a child he was constantly wetting his bed, and as a boy he was called on suddenly and repeatedly to evacuate his urine.

It is certain, however, that one person may have repeated attacks of gonorrhœa and escape any future urethral trouble, whilst another will be afflicted with the worst form of stricture, after but one or at most two attacks of the kind.

Symptoms.

The general symptoms of stricture are :—a difficulty in voiding the urine, the stream being smaller than natural, and oftentimes forked or spiral. The calls to micturate are frequent. There is gleety discharge, or increased mucous secretion. The act of emission of the semen is imperfect, and

attended with pain at the time, or uneasiness afterwards.—

If situate at the bulb, the patient besides the general uneasiness afterwards, complains of a sense of titillation or of itching; and there is a dribbling away of the last drops of urine.

A very frequent, I might almost say an invariable symptom of stricture at the bulb of the urethra, is a feeling of inability, when voiding urine, to expel the last drops from the canal. The patient is conscious that there is still some portion left behind, and this makes him uneasy. Now, if we consider the function of the bulb, this symptom is at once explained. According to Dr. Guérin, of Vannes, the bulb of the urethra, serves for the expulsion of the urine left in the spongy portion of the canal. It is thus, a kind of appendage to the canal of the urethra, intended for the evacuation of the urine contained in that part of the canal which is anterior to the membranous portion; and, were it not for its intervention, the *accelerator urinæ* could not perform its function, namely, that of propelling the urine*. When, therefore, the canal is narrowed by stricture, there is no appreciable space for the urine to accumulate in, and the office of the *accelerator urinæ* is nullified, the muscle has nothing to contract upon. Hence, it is only after some little time has elapsed, that the liquid pent up in the dilated membranous portion dribbles away in these cases.

* Archives gén. de Médecine, Nov. 1850, p. 355.

If the stricture be in the membranous portion, there is more proneness to spasm in conformity with the anatomical relations of the part, there are frequent partial erections, and gleety discharge, attended with agglutination of the meatus.

If, again, there be in addition, irritation in the prostatic portion, pain is felt at the end of the penis and in the *glans*, and after voiding urine;—frequent emissions take place, and there is more or less uneasiness referred to the testicle or groin.

I remember an instance of a gentleman who had been afflicted with stricture for some years, and who always complained of pain in the body of the right testicle while voiding urine. The pain came on the instant the urine reached the prostatic portion of the urethra, continued violent during micturition, and gradually went off a few minutes afterwards. The testicle was not swollen or tender to the touch. The stricture in this case yielded readily to dilatation; and, in proportion as the stricture improved, the state of the prostatic portion of the urethra improved, and the pain in the testicle disappeared.

It is by no means unusual, under such circumstances, to meet with profuse discharge of a puriform character, coming on after sexual intercourse, especially if carried to excess, and which is liable to be mistaken for that of gonorrhœa.

Partial erection is frequently a troublesome symptom in this disease, and is most common at

night. I believe it often proceeds from the bladder being full, and thus impeding the return of venous blood:—The consequence of which is, that the cells of the spongy structure of the urethra become gorged.

Some patients with stricture, occasionally have bleeding from the urethra; which is mostly due to an irritable and congested state of the mucous membrane of the bulb; but may at times be referred to varicose distension of the prostatic plexus of veins.

Herpes preputialis, is occasionally met with in connexion with stricture, according to Dr. Bateman, who states the fact on the authority of Mr. Copeland. In the early part of last year, a gentleman, aged twenty-four, had been under my care, on account of urethral discharge, depending on a disordered state of the back part of the urethra, following a severe attack of gonorrhœa. His stream of urine was small and spiral, and he had much difficulty in getting rid of the last drops. He was progressively improving under constitutional treatment, and the occasional use of the bougie, when all of a sudden his prepuce exhibited a full crop of herpetic vesicles.

Rigor, is a symptom peculiar to certain constitutions, and to which individuals who have lived in tropical climates, are chiefly subject.—It seems to depend on the passage of urine along an irritable surface.

Prolapsus of the rectum, with a congested state of the hemorrhoidal vessels from straining, is not an unusual accompaniment, where the stricture is of some standing, and proves very harrassing to the patient.

Persons with tight callous stricture are sometimes impotent:—they may still retain the power to copulate, but are unable to procreate, because the seminal fluid, instead of being ejaculated, passes backwards into the bladder, or is pent up in the dilated portion of the urethra behind, and trickles out by slow degrees, either by itself or with the urine. Others, again, experience an inaptitude or disinclination for sexual intercourse, in consequence of the sensibility of the urethra being impaired, by the diseased condition of the lining membrane.

The most serious result of coarctation of the urethra, is retention of urine.—This may be caused by spasmodic muscular action, by a congestion, or inflammatory condition of the mucous lining, or by the increment of the fibro-plastic deposit.—It generally comes on after a long journey, when the urine has been retained for more hours than the bladder is ordinarily accustomed to; or, after a debauch, from the increased afflux of blood to the part.

The urine, during the early period of stricture, varies little, if at all, from the natural standard; eventually, however, as the disease advances, it

becomes more or less alkaline, and loaded with phosphates, and mucus. Under these circumstances it forms an additional source of irritation.

It must not be supposed, that the symptoms above mentioned, belong exclusively to stricture. On the contrary, there may be pain in the urethra, frequent desire to make water, independently of any such malady, in certain affections of the brain, in calculus of the prostate gland, and in morbid conditions of the kidney, or the neck of the bladder.—Thus, I had a patient under my care, labouring under symptoms akin to those of stricture, caused by a mulberry calculus in the kidney.—Another patient, who suffered during two or three months from frequent micturition, attended with considerable urethral irritation, spasm, and so on, at length voided a small hydatid, when all the symptoms subsided.

In like manner, the symptoms of obstructed urethra may be caused by tumours in the vicinity,—by the pressure of an abscess, or even of a hydrocele or hernia, through mere displacement of the canal. Much distress of this nature is often occasioned by disease of the rectum and anus, from what may be called sympathy of contiguity.—A gentleman, whom I attended for excoriation, or rather superficial ulceration of the rectum, together with a loaded state of the hemorrhoidal veins, had great trouble and uneasiness in discharging his urine. Another patient, who was similarly annoyed,

in consequence of having a pendulous tumour within the rectum, attached by a narrow pedicle, two inches up from the anus, and which every now and then protruded outside the gut,—I succeeded in permanently relieving, by passing a ligature round the neck of the tumour, and removing it. Its structure was that of a dense fibrous tissue.

SECTION IV.



SECONDARY PATHOLOGICAL EFFECTS.

The next subject for consideration, is that of the secondary pathological effects resulting from stricture.

When the stricture has existed any length of time, the portion of the urethra immediately behind, is uniformly dilated; while the portion anterior, becomes more or less straitened, tense, and rigid, owing to a slow inflammatory process, caused and maintained by the nature of the urine; this fluid being rendered irritant by stagnation in the bladder. Again, where there are two strictures, the intermediate portion is dilated. This is well exemplified, in a preparation of mine, which shows a narrow stricture at the fore part of the membranous portion, and a second just in front of the bulb; and here the bulbous part is excessively dilated.

In cases, too, of long standing, the ducts of the prostate become enlarged, as do also the ejaculatory ducts. This may be ascribed to protracted irrita-

tion, from the pressure of acrid urine upon the orifices of the ducts.

Another sequel of stricture is ulceration.—If the morbid surface be often excoriated, by mechanical or other irritation, its texture inflames readily, and then ulceration supervenes. This may happily be limited, and, by loss of substance, permit a passage to be obtained. Often, however, it proceeds to such an extent, that the urethra is destroyed, and a urinary fistula established.

A urinary fistula, is a sinuous ulcer, communicating, on the one hand, with the excretory duct of the bladder, and terminating on the other, on some part of the external surface of the body. In some instances, the sinus is long and tortuous, terminating at a distance from the bladder; as, for example,—on the side of the chest, or the abdominal walls, according to Ducamp, or the groin or the thigh:—the sinus or sinuses, however, are most generally met with in the perineum, scrotum, or nates.

There are frequently several openings of this kind: they generally emit a gleet secretion. In certain cases, the urine passes partly by the urethra, and partly by the fistulous opening or openings; in others, according to the amount of obstruction, solely by the latter. It may be observed, that the fistula is lined with a membrane, almost, if not identical, with mucous membrane.

The great risk of ulceration, however, is the

tendency to extravasation. If in stricture at the anterior part of the bulb, ulceration ensues immediately behind it, and extravasation follows, the urine makes its way into the cells of the *corpus spongiosum*, and the issue is generally fatal. The *glans penis* sloughs: the indication of this is a black spot. Sir B. Brodie says, that, whenever he has seen the black spot in this situation, the patient invariably dies. From ulceration here, spasm is frequently induced, the urethra being forcibly contracted by the action of the anterior, bifurcated or diverging fibres of the *accelerator urinæ* muscle, where they embrace the *corpus spongiosum*, although not in direct contact with the urethra.

In more fortunate cases, the result may be the formation of a simple abscess. This is indicated by a sense of uneasiness and weight in the perineum, followed presently by a swelling in this situation. The swelling augments, and is attended with shooting pain, rigors, and fever. The superincumbent integument presents a red blush, with a feeling of fluctuation, indicative of the existence of pus, which finds its way out either by a natural or artificial opening.

The penis, in some cases of stricture, is more or less indurated and swollen, particularly the glans. This turgid condition of the glans, if occurring at an early stage, denotes a high degree of inflammatory action, associated with congestion of the back part of the urethra; at a later period, it is still

characteristic of morbid action in some remote part of the canal. It may be readily accounted for, when there is disease about the prostate, inasmuch as the enlargement of this gland, by causing and keeping up pressure against the venous plexus, situate at the neck of the bladder, will thus prevent the return of venous blood. This plexus of veins, is enclosed in a sheath of fascia connected with the prostate ; hence, we can readily understand why the above phenomenon should take place.

A well marked instance, of induration and thickening of the extremity of the glans penis, in consequence of long standing disease at the back part of the urethra, has recently been under my treatment. The following is the history of the case :—

The first symptoms appeared, about the expiration of the summer of the year 1843. For months previously, the patient had been in a very low state of health, in consequence of domestic calamities, and had also, for about twelve months, been living upon a spare vegetable diet. He appeared to have then experienced, a gonorrhœal discharge, accompanied by considerable irritation, and a constant desire to pass urine,—a difficulty in passing it, and a seeming difficulty in retaining it. It was treated as an ordinary clap, notwithstanding the assertion of the patient that it could be nothing of the kind. In about three or four months a swelling came in the perineum ; there was increased difficulty in

passing urine, with a sensation of scalding in the neighbourhood of the swelling in the perineum; the urine came away drop by drop, and only with much straining. Leeches, fomentations, &c. were then had recourse to, but without relief. The tumour in the perineum continued to enlarge, till it became about the size of a pigeon's egg. At this period, the patient came under my care. I found he had a tight callous stricture, attended with gleet discharge, which, however, improved rapidly under the use of the bougie. The swelling in the perineum subsided spontaneously; he subsequently neglected treatment, and in consequence suffered from hemorrhoids, abscess by the side of the rectum, and other symptoms of deep-seated disease about the prostate and neck of the bladder,—connected evidently with venous obstruction. In a few months, he again returned to me, with aggravated stricture, and that indurated condition of the glans penis above mentioned, more decidedly marked than I have ever met with.

The spermatic and hemorrhoidal veins, frequently, as is well known, become varicose; and, as a proof of the sluggish circulation, in the veins of the genito-urinary system generally, may be mentioned the fact, of their being repeatedly stopped up with phlebolites,—calculous concretions, composed of phosphate and carbonate of lime.

That the mucous membrane of the bladder gets into a state of chronic inflammation, is evidenced by

the character of the urine, which becomes thick and loaded with ropy mucus.

In proportion as the stricture augments, the desire to void urine becomes more frequent ; the tardy stream necessitates a preternatural contraction of the bladder, which cannot be sustained, however, a sufficient time to expel the whole contents ;—hence the irritation experienced at the neck of this viscus. Moreover, the muscular texture progressively increases, in strength and volume ; a circumstance, which may account for the early symptoms of stricture, not being attended with material inconvenience ;—inasmuch as the increased and increasing propelling power of the bladder, countervails the gradual diminution of the canal. Here nature steps in, so to speak, to overcome a difficulty. But after a while, as the difficulty of propelling the urine, through the narrower channel, becomes greater, other changes occur.

The bladder continually over-strained, becomes not merely hypertrophied, but likewise sacculated, —owing to the mucous membrane being forced between the muscular fibres.

The consequences are, that the urine is pent up, altered in its qualities, and thus exercises an acrid and erosive agency, on the surfaces with which it is in contact. To the same cause, may be traced, in some instances, the formation of encysted calculus ; in others of abscess in the sub-peritoneal cellular tissue ; in others, again, the invasion of peritonitis

of a fatal description. In the latter, it is the close contiguity of the mucous membrane to the peritoneum that gives the predisposition*.

Further, we find at times, the ureters thickened and dilated; and the kidneys transformed into a mass of cysts, (preternatural dilatations of the calices),—the natural structure of the kidney being quite destroyed.

* Malignant fungus of the bladder, is a most serious complication of stricture. I saw a man, a few days before his death, thus afflicted. He was fifty-three years of age, the father of a large family. He had suffered occasionally, from some difficulty in passing urine, but not to any great extent; was extremely susceptible to cold, and changes of weather. In other respects, he considered himself tolerably well, until four months previously, when he was seized with influenza. At the date of my seeing him, he complained of pain at the lower part of the belly, and uneasiness in the loins, and of feeling weak and depressed. He had lost flesh. His countenance was sallow and anxious, and his mouth tremulous. His micturition was frequent, followed by pain in the glans penis. His urine was thick, tinged with blood, with small flakes of coagulable lymph floating in it, and exhaling a peculiar cadaverous smell.

After his death, which was sudden, yellow transparent fluid was found in the cavity of the abdomen, and a fungus growth occupying the entire internal surface of the bladder.

The ureters, the pelvis, and infundibula of the kidneys, were filled with urine. The kidneys were pale; one contained pus. The ureters, at the point of entrance into the bladder, were closed up with the morbid growth.

The urethra was thickened; its inner surface vascular; and the canal, contracted to nearly one half its natural calibre. throughout the membranous portion.

Where the morbid action extends to the *vesiculæ seminales*, it is very apt to pass on to the testicle. Again, it is certain, that there are many chronic affections of the testicle, which depend either on stricture, or urethral irritation ; for, in proportion as you improve the condition of the urethra, you abate the disease of the testicle. A gentleman had suffered for a considerable time, from a thickened and irritable, and disordered condition of the lining membrane of the urethra, throughout its entire length. He had likewise irritability of the bladder, enlargement and induration of the left testicle, gleet, semi-puriform discharge, with general uneasiness referred to the perineum.—He passed disturbed nights. Any attempt to introduce a bougie, was attended with so much pain and inconvenience, that it was obliged to be laid aside. He contracted a sore of a suspicious character, and I prescribed a course of mercurial pills. He persevered in the use of the remedy, steadily during six weeks, and was slightly affected by the mercury. The sore healed ; the testicle regained its natural size, and the urethra got well without any mechanical aid.

In the above case, the bladder was irritable, and it is not unlikely, that one of the *vesiculæ seminales* partook of the same irritability, which thence found its way to the testicle. To the quiet and regular life he observed, while taking the medicine, it is highly probable, that he was mainly indebted for

the subsidence of irritation, in the reproductive organ.

Acute swelling of the testicle, is a frequent attendant upon stricture, and is consequent on an inflamed state of the canal behind the stricture. The inflammation extends, or is communicated, to the orifices of the ejaculatory ducts in the prostatic part of the urethra ;—thence to the vasa deferentia, vesiculæ seminales, and testicle.

It may be laid down as a general rule, that stricture keeps up a tendency to inflammation in adjunct structures, and this applies especially to the prostate gland. In the prostatic portion of the canal, the mucous membrane is in close connexion with the gland, no loose cellular tissue intervening. The gland itself, as Mr. Adams has accurately pointed out, in his “ Treatise on Diseases of the Prostate,” is completely invested by a fibrous capsule, which encloses within it the prostatic plexus of veins, and the blood vessels and nerves of the prostate ; the veins being continuous in front, with the dorsal vein of the penis ; and behind, with branches terminating in the internal iliac veins.

The proper capsule of the gland, is dense and unyielding, adheres firmly to the glandular texture, and is divisible into two layers, between which the prostatic plexus of veins runs. Inflammation, then once set up in the mucous membrane, is very prone to pass to the fibrous covering, especially in gouty or rheumatic subjects, creating a continued, agonizing, stretching and depressing pain,

analogous to that, experienced in inflammation of the sclerotic tunic of the eye.—Where the gland itself inflames, there is throbbing pain, referred to the perineum and anus, with great distress in voiding urine, partly referable to the compression and consequent turgescence of the adjunct veins, caused by the unyielding fibrous layers.

Inflammation here, may terminate in resolution, in abscess, or in chronic enlargement. Its chief cause, is obstruction to the free passage of urine, through the membranous portion of the urethra*.

* A man died at the age of forty-five, who had suffered from stricture for some time. On examination, it was ascertained, that the stricture was situate at the anterior part of the membranous portion, just where it joins the bulb; the mucous membrane behind the stricture, was generally thickened. The prostate gland was much enlarged, and in the right lobe was an abscess, containing foul matter. The bladder was much enlarged, and fasciculated; its muscular and mucous coats were thickened. The enlargement of the prostate, independently of the stricture, must have offered a barrier to the evacuation of the urine.

At the inspection of another man, who died at the age of forty-eight, with a tight fibrous stricture, at the membranous part of the urethra, numerous fistulous openings in the perineum, and with the adjunct skin and cellular tissue in a sloughy condition, the prostate gland was found considerably enlarged, and contained, within its structure, several small collections of pus. Upon making pressure, pus escaped freely from the orifices of the prostatic ducts into the urethra. In a third instance, that of a man thirty-seven years of age, who had a short narrow stricture, an inch and a half from the orifice of the urethra, the prostate was enlarged and distended; and on being cut into, the whole of its substance was found infiltrated with pus and blood, and nearly in a state of gangrene.

SECTION V.

TREATMENT.

MODE OF ASCERTAINING THE SEAT AND NATURE OF THE
OBSTRUCTION.

In every case of obstructed urethra, it is the duty of the surgeon, to ascertain, in the first instance, whether the obstruction depends on a cause within the urethra, or a cause external to that canal. The flow of urine may be prevented, as already stated, by tumours in the pelvic region, or by mere spasmodic contraction, of the neighbouring muscles; and under either circumstance, rash or meddling surgical manipulation, might prove alike hurtful to the patient, and to the professional reputation of the practitioner. A careful examination of the pelvic region, and of the previous history of the case, will obviate any error of this kind. If there be distinct evidence, that the obstacle is situate in the urethra, the next step is to determine its nature. This is accomplished by means of a bougie, smeared with oil or cerate. In introducing this instrument along the canal, it ought to be held lightly like a pen, and gently turned round, lest it catch in one of the mucous crypts. During its passage, the penis, held between the thumb and fore-

finger of the left hand behind the gland, so as not to compress the urethra, ought to be gently elevated towards the abdomen. When the bougie has reached the point of obstruction, a mark may be made on it, parallel with the orifice of the urethra, to denote the exact distance at which it is stopped. It is then to be withdrawn, and another of a similar size, corresponding to that of the stream of urine, introduced, and passed, if possible, through the contraction. Should spasm supervene, during the procedure, the perineum is to be gently rubbed with the hand. The bougie first employed, should correspond in thickness to the size of the urethral orifice.

The practitioner ought to keep in mind, that there are, in the natural or healthy state of the canal, slight impediments, which may tend more or less to oppose the free passage of the instrument.

Such may occur at the *lacuna magna*, or any of the other mucous crypts; at the dilatation of the bulb; at the ligament of camper; the anterior edge of the prostate; in the *sinus pocularis*; or at the neck of the bladder.

Should there be difficulty in getting the point of the small bougie to enter the stricture, it will be advisable to take a mould or cast by means of what is called a modelling bougie.—This instrument consists of a tuft of camel's hair, or shreds of fine thread, coated with soft tenacious wax, inserted upon the end of a common bougie, and may be procured at most surgical instrument makers.

By taking, in this manner, the impression of the face of a stricture, I have been enabled to discover the exact situation of the minute orifice, and thereby advance the bougie in the requisite direction.

I recollect a case of old firm stricture, at the bulb, which resisted the passage of an instrument, during seven months, notwithstanding repeated attempts had been made by surgeons of repute. The patient discharged his urine only by drops, and with fearful straining ; and, during sexual intercourse, the semen passed backwards into the bladder : after trying every variety of instrument, and every kind of manœuvre, and while just on the point of abandoning the case in despair, I had recourse to a small modelling bougie. This showed me that the entrance to the stricture was at the lower part of the urethra, and enabled me to introduce a fine wax bougie.

An ingenious mode of taking impressions of stricture has been recommended by Professor Bigelow, of Harvard University in the United States*. It consists in the employment of gutta percha. He has performed numerous experiments with it, and thinks it far superior, for this purpose, to the wax commonly used. His method of employing it is to take a medium sized bougie of this material well oiled, and to pass the tip rapidly to and fro in the edge of the flame of a candle, until it is so warm as to be indented by the

* Gross, on the Urinary Organs, p. 626.

nail ; the mass will remain plastic after the surface has ceased to be hot, and may be quickly carried down to the stricture, being very smooth and pliable. If it be pressed against the obstacle for a minute with a force equivalent to the weight of one or two ounces, and then left within the part triple this space of time to cool, it will present, when slowly and carefully disengaged from the stricture, a firm, unyielding, and most accurate impression. The gutta percha used for this purpose should be perfectly pure, and no warm water should be employed in preparing it, as the steam given off by it has a tendency to soften the bougie for several inches, and render it liable to curl up against the stricture like a small elastic bougie.

Having pointed attention to the manner of exploring the urethra for stricture, the next object is the treatment. This may be ranged under three heads, namely, that by dilatation ; by cauterization ; and by incision.

SECTION VI.

TREATMENT BY DILATATION.

The method by *dilatation* has the sanction of long usage. Ambrose Paré recommended for the purpose a wax candle with a slender wick, and hence the application of the word *bougie* in this sense.

The bougies in common use are the catgut, wax, and gum elastic. Some practitioners employ those made of metal—for my own part, I prefer the bougie-catheter, a gum elastic instrument. It is about thirteen inches in length, forming a hollow cylinder for the extent of eleven inches, at which point there is an eyelet; the extremity beyond is solid and tapering. It may be described as a short conical bougie affixed to a catheter. It possesses many advantages over either instrument singly. Thus, it may be introduced merely into the stricture, and retained there without incommoding the prostatic part of the urethra; and should there be any sudden call to void urine, it can be gently passed on into the bladder, and after it has served the purpose of a catheter, be again restored to its former position. Where the stricture is very narrow, the

fine catgut bougies will be found eligible. These, when allowed to remain in for some time, swell up, and dilate on the principle of a sponge tent.

Metallic instruments, however highly polished, may communicate a harsh sensation along the urethra; and, if used with force, will rupture the delicate lining membrane of this canal, cause bleeding, and not unfrequently make a false passage. Hence their indiscriminate use is objectionable, and more especially in unskilful hands.

It is well known that patients often faint the first time an instrument is passed, from the nervous shock to the system; for this event, the surgeon ought always to be prepared.

I now proceed to the treatment of passable or pervious stricture.

When stricture begins to form in the shape of a fold, with thickening of the mucous membrane, there is always more or less coagulable lymph effused into the layers of this fold. Here the single introduction of a bougie will often suffice to break up the obstruction before it has become firm or organized, and enable the patient afterwards to discharge his urine in an ample stream. Again, the stream may be impeded by slender, delicate fibrous septa, the result of cicatrices, or valvular folds, and set free by once passing a moderate-sized instrument.

Dilatation may be employed in a variety of ways; thus, the instrument may be allowed to

remain for a few minutes, and again introduced in the course of a day or two, its size being augmented in proportion as the stricture yields. In other cases, in which the passage of an instrument has been tedious and attended with unusual difficulty, I make it an *invariable* rule to let the instrument, whatever it may be, remain for some time in the stricture. The time, of course, must be regulated by circumstances, such as the sensibility of the canal, and the exigency of the case.

This procedure, which may be termed the gradual dilatation, is followed by great amendment in the majority of instances. The following is the *rationale* of the practice, according to M. Béniqué: —“ The presence of the foreign body in the first
“ instance, occasions a determination or afflux of
“ blood; there then ensues a secretion of a variable
“ character. The mucous membrane pours out
“ around the foreign body a copious, viscid, smeary
“ fluid, which, in its healthy state, is secreted only
“ in small quantity. If the contact of the foreign
“ body be maintained, this secretion becomes gradually thicker and thicker, loses its transparency,
“ and assumes more or less the appearance of pus;
“ at the same time, the blood which had engorged
“ the adjunct structures has in part disappeared,”
. “ and the foreign body is subsequently
“ more free than before*.”

Dilatation may sometimes be accomplished ra-

* Op. cit., p. 170.

pidly by introducing a small instrument first, then withdrawing it, after the lapse of five or ten minutes, and replacing it with one of larger size, and so on, until a full-sized instrument is passed. This plan may be tried where it is of importance to gain time; although it must be confessed, that when the surgeon, in his over-anxiety to cure his patient, increases the size of the instrument very rapidly, he will, by causing irritation, defeat his purpose, and be compelled to suspend the treatment for a while. It is on the whole safer to allow the bougie to remain for six or seven hours, provided it can be tolerated, before it be exchanged for one of greater thickness. I am no great advocate for rapid dilatation in general, because I believe that a more permanent cure is effected by the slower and gradual method, that is to say, by allowing an interval of days to elapse before the size of the instrument is changed.

Constitutional means are not to be overlooked in the course of treatment. The state of the digestive organs and of the alvine discharge ought to be attended to, as also that of the skin. Warmth is a useful auxiliary: it is indisputable, that cold has a prejudicial effect in diseases of the urethra, particularly stricture. Hence, the surgeon will often be foiled in attempting to introduce a bougie in cold weather, and during the prevalence of north-easterly winds. It is, therefore, expedient that the temperature of the apartment for the patient be

genial, and that the instrument have the warmth at least of the human body before being used. Chloroform will be found a valuable auxiliary, where the patient is highly sensitive and disposed to spasm. By attention to the above suggestions, much unnecessary poking will often be saved.

Dilatation, judiciously conducted, will answer the purpose in the great majority of cases. Even old, tight, hardened, and so-called cartilaginous strictures will improve under the repeated or sustained contact of a bougie, be it ever so fine, provided it be fairly introduced within the contracted orifice.

Whatever be the treatment adopted, the surgeon must always forewarn his patient of the proneness of stricture to return. Hence, the propriety of passing an instrument occasionally after the cure is accomplished. For, if this be neglected, and the patient lead an irregular life, the disease will almost certainly relapse. I have known persons thus circumstanced from indulging in stimulating food and the use of malt liquors, particularly ale, containing much saccharine matter; or, from too frequent sexual intercourse, an irritable condition of the mucous membrane is thus set up, which leads to spasmodic contraction of the contiguous muscles, venous congestion, and all the train of evils formerly described. This, moreover, accords with the law in pathology, namely, that any texture of the body once stricken with disease,

is impaired as respects its power of vital resistance.

Under this head, I may briefly advert to an operation, devised by Mr. Syme, for the cure of the gristly or resilient stricture, which, although still permeable by a bougie, resists all ordinary attempts at dilatation. It consists in dividing the stricture within outwards, by external incision on a grooved director. The results of this operation in London are unsatisfactory. Some of the patients who have undergone it succumbed from the shock to the system, others from hemorrhage, and a few of the remainder are now incommode with perineal fistula. It would seem, indeed, that the cases in which it is at all admissible are of exceeding rarity.

Mr. Symes' Operation.

In performing this operation, the patient is to be placed, in the same position as for lithotomy, with the feet and hands bound together. The small curved director is then to be carried into the bladder, chloroform having been previously administered. An assistant, with one hand holds the director steadily in its proper situation, and with the other, raises up the scrotum. The surgeon then cuts down on the stricture with a scalpel, in the raphé of the perineum, till it reaches the groove of the director; during which step he

presses forwards, with the finger of his left hand, the perineum on each side of the incision. With a straight probe pointed bistoury, he in the next place divides, from *within outwards*, the strictured portion of the canal, towards the scrotum or pubes on the one hand, and towards the rectum on the other. This being accomplished, he finally passes a full-sized gum catheter, from the orifice of the urethra into the bladder, and lets it remain, properly secured with tapes, for forty-eight hours. Should any artery be wounded, it ought to be tied before the patient is removed to bed, otherwise troublesome hemorrhage may follow. The subsequent treatment of the case, consists, in the introduction of the catheter at suitable intervals. I believe that in some instances the above operation has been performed by the subcutaneous section.

Impassable Stricture.

The next class of stricture comprehends such as are still pervious to the urine, but which will not admit of the passage of a bougie or catheter; these are called impassable strictures. Here we may resort to the continued pressure of a bougie, kept steadily fixed against the stricture. This seems to set up a kind of interstitial absorption, whereby admission is eventually gained for the entrance of the bougie. The action may be compared to that, in which an aneurismal or other tumour determines, by continued pressure, the absorption of bone.

At first, the pressure may be kept up daily for the space of ten, fifteen or twenty minutes; and attention should be had that the pressure is always directed to the same part. ¶ After persevering in this way for a few days, an attempt may be made with a very fine wax or catgut bougie—when it may possibly enter the orifice of the stricture.

Then, after a few days have passed, another attempt must be made; and although no perceptible advancement may have taken place, and just as the surgeon is about to relinquish the case in despair, all of a sudden the instrument may slip in, and render him master of the passage. Instances of this kind demand the utmost patience on the part of the surgeon, and the utmost confidence on that of the patient. Where the stricture is very obstinate, it has been proposed to keep the bougie fixed against it for some days, even for a week. This, however, would necessarily be attended with much inconvenience, as it would require a relay of assistants.

SECTION VII.



TREATMENT BY CAUSTIC.

The employment of a bougie armed with caustic potash, has been advocated in this form of stricture. It was introduced by Mr. Whately, nearly half a century back*, and has been revived by Mr. Wade, Surgeon to the Westminster General Dispensary.

Mr. Wade† recommends, before using the potash, that a bougie be passed down to the stricture, that its distance from the orifice of the urethra may be correctly ascertained. A small piece of the caustic is to be inserted into a hole made in the point of a soft bougie. The eighth part of a grain is the smallest, and a grain the largest quantity of the potash he uses, but it is seldom necessary to exceed the sixth of a grain.

It will be well, he observes, to make two notches on the bougie containing the potash ; one marking the exact distance of the stricture, the other an inch beyond ; as very probably, on introducing the

* Improved Method of treating Stricture in the Urethra.

† Stricture of Urethra. London, 1849.

armed bougie, the first mark may be concealed within the urethra, from the penis being more stretched than when the measurement was taken. The bougie must be well moulded round the potash, so as to prevent the alkali from projecting; and it should be so placed, that it may be more applied to the upper, than the lower part of the stricture. The bougie thus armed, and previously well oiled, is to be rapidly passed down to the stricture, and held against it, with gentle but steady pressure, for one, two, or three minutes, according to the nature of the obstruction, and again introduced so soon as the irritation produced by its application has ceased.

Of this practice I have had no experience whatsoever.

Many surgeons have commended the use of nitrate of silver. It was first employed by Mr. Hunter; afterwards by Sir E. Home; and subsequently by various French surgeons, particularly Ducamp, Lallemand, and Leroy d'Etiolles. Applied as an *escharotic* it has often done mischief. Thus, in some instances, the parts in front of the stricture have been destroyed, or materially injured; false passages formed; formidable hemorrhage produced; or, urgent retention, requiring the bladder to be punctured for its relief. In others, the virile power has been destroyed, and the stricture rendered more intractable than before.

Nitrate of silver may be occasionally of service

however in the case of impassable stricture, as a means of allaying irritation, when its application must be only momentary. After it has been used in this manner, a small bougie will sometimes enter. One of the best instruments for applying it is the *porte caustique* of Mons. Leroy d'Etiolles.

Some of our continental brethren have advised the rather extreme measure of forced catheterism, and incision external to the stricture. But, as the patient is not supposed to be suffering from retention of urine, or his life in jeopardy, it would be unjustifiable to hazard either the uncertainty of forcing a passage, or the danger of cutting down to the urethra.

SECTION VIII.

TREATMENT OF RETENTION.

The next point for consideration is the treatment of impermeable stricture, that condition in which the urine can no longer escape. Here the patient is seized with the symptoms of retention, namely, frequent inclination with inability to void urine—pain, more or less severe, referred to the neck of the bladder and perineum, with a bearing down sensation—tumour and tenderness in the hypogastrium, and which, if unrelieved, prove fatal in five or six days, through rupture of the bladder, mortification and sloughing of its coats, the absorption of pus, or of the noxious principles of the urine.

In a case of retention connected with stricture, the first indication is to allay spasm, which is almost always present. Mr. Abernethy, in one of his lectures, says,—“ When I was young, it used to
 “ be a question at Surgeons’ Hall, ‘ What would
 “ ‘ you do, Sir, in a case of retention of urine?’
 “ If the respondent answered, ‘ Sir, I would bleed,
 “ ‘ and bathe with tepid water, and so on, and
 “ ‘ allay irritation!’ But would you introduce a

“ catheter if the other were to say? ‘ No, Sir,
“ ‘ I would rely upon the other measures;’ they
“ were considered good answers, and these ques-
“ tions were often put by Mr. Pott. This was the
“ sum total of his experience, and it is the sum
“ total of mine*.”

The treatment which Mr. Abernethy recommended was to place the patient in bed, to sponge the perineum with warm water, and to foment the lower part of the abdomen with flannels wrung out of hot water. He further enjoined the application of leeches to the perineum, and if the patient were plethoric, blood letting from a vein in the arm. Opium he exhibited, either in the form of clyster, or by the mouth in combination with calomel, premising a dose of castor oil to clean out the bowels†. His line of practice was, first, to give

* Lectures on Surgery, p. 226.

† An instance of the good effects of opium, in a dangerous case of retention of urine, is recorded by the late Mr. Pearson, in the “ Medical Observations and Inquiries,” p. 246.

“ In the month of September 1782, W. S. placed himself
“ under my care, on account of a recent gonorrhœa. Some
“ years before this, he had contracted a similar disease, and, in
“ consequence of that, had not evacuated his urine with the
“ usual freedom. The obstruction was not so considerable as to
“ demand his attention, except after taking cold, or upon the
“ immoderate use of spirituous liquors. A retention of urine
“ was the consequence of such irregularities; but the attacks of
“ this complaint had not hitherto been violent; for a cooling
“ purgative, rest, and proper regimen, generally removed the
“ symptoms in a day or two.

the castor oil, then apply leeches, and next use the warm bathing.

“ When I first saw him, although the gonorrhœal inflammation was by no means severe, yet he had not voided above a few spoonsful of urine for three days. Every attempt to make water was attended with considerable straining and pain; his bladder was much distended, his skin moderately hot, with a full and frequent pulse.

“ He was bled freely, took purgatives made with calomel, salt of tartar, jalap, and opium. Several plentiful stools were produced, but no evacuation of urine, except at the time of going to stool, when about a spoonful was voided with great pain. He was placed in the warm bath as frequently, and remained in it as long each time, as he could sustain without absolutely fainting. Gently stimulating clysters were thrown up the rectum without any good effect. To introduce the catheter was impracticable; for the inflammatory affection of the urethra concurring with the strictures, had so contracted the urinary canal, that it would barely admit a bougie of the smallest size to pass into the bladder. The urethra was now become so extremely irritable, that the gentlest introduction of a bougie gave exquisite pain; and the only effects produced by it were, ineffectual efforts of the bladder to evacuate its contents, and a temporary convulsion. About a spoonful of urine came away, very turbid, of an offensive smell, and mixed with blood.

“ The penis became red, tumefied, and affected with an œdematous phymosis. This was his melancholy situation on the third morning from my first seeing him. He was become too weak to suffer much more evacuation. The *liberal* use of opium was therefore resolved upon; and I proposed giving it to such an extent, as very considerably to *suspend the tonic action of the moving fibres*, hoping thereby to deprive the sphincter vesicæ of its contractile powers. He took a grain of Thebaic extract every hour, and when four grains were taken, the

“ desired effect happily took place. He fell asleep, and during
“ that time the urine flowed from him involuntarily, in such
“ quantities as to run through the bed upon the chamber floor.
“ After sleeping six hours, he awoke very much relieved, and
“ from that period the inflammatory symptoms gradually dis-
“ appeared. He took one grain of opium twice a day, was kept
“ open by cooling laxatives, and, with the assistance of a proper
“ regimen, in the course of eight days he was as well as before
“ the attack.

“ The gonorrhœa and strictures were cured in a moderate
“ time afterwards, without any unfavourable circumstance super-
“ vening.”

SECTION IX.



FORCED CATHETERISM.

Now, supposing that these preliminary measures have been resorted to, and the patient is still unable to void urine,—what is to be done? Certainly, death must follow, if the bladder be not relieved. Under such circumstances, an attempt may be made to introduce a small catgut or wax bougie, or a small bougie-catheter into the orifice of the stricture, and then allow it to remain awhile, and possibly on withdrawing it a minute, jet or hair-like stream of urine follows. Failing this, recourse may be had—to forced catheterism, “taking the part by storm,” so to speak.

The best instrument for this purpose is a silver catheter, with a conical extremity. It should be kept steadily pressed against the obstruction, and gradually forced onwards in the right direction until it reach the bladder, the surgeon meanwhile supporting the perineum with one or two fingers of his left hand. This procedure requires the utmost nicety and tact, and an accurate anatomical

knowledge of the course of the urethra, otherwise a false passage may be formed.

This circumstance, however, need not deter the experienced surgeon, for the formation of a false passage may be unattended with mischief. I saw a case, many years ago, in which a silver catheter had been driven between the bladder and rectum, and the end of it could be felt fairly in the gut. I merely passed a full-sized gum elastic catheter, and allowed it to remain for some time: no bad consequences followed. The obstruction was supposed to depend on stricture, whereas it arose from enlargement of the prostate gland.

Puncture of the Bladder.

If the obstruction cannot be overcome by the above plan, then resort must be had to an artificial opening, made through the perineum, the rectum, or above the pubes.

Before proceeding to describe these several operations, I should wish to invite attention to a method suggested by the late Mr. Chevalier, and of which an account is given in vol. II. of the "Medico-Chirurgical Transactions."

He found, that, in some cases, considerable advantage was gained by making a free incision through the hardened integuments external to the urethra, and behind the stricture; because the urethra itself was not primarily diseased to any

great extent, its canal irregular and its internal surface crumpled, owing to the mischief around it. Mr. Chevalier conceived that this state was common when the disease originates from external violence. There can be no doubt that by this procedure you not merely relieve the tension of the part, but also unload the turgid vessels. He was led to adopt this line of practice, in consequence of finding in several instances where the parts had been removed after death, although the smallest instrument could not be passed before without the greatest difficulty, yet when they were detached, a large catheter has easily gone into the bladder.

As a remarkable illustration of this fact, he refers to the case of a patient who had laboured under fistula in perineo for twenty years, during which time a bougie had been passed only once into the bladder. The man died of consumption. On inspection after death, it was expected to find the urethra almost closed up for a considerable extent; yet on removing the parts, and the urethra being disengaged from the hardened cellular membrane and skin, a sound was readily carried into the bladder: no regular stricture was discovered on laying open the canal. The impediment was occasioned by pressure from without.

Puncture through the Perineum.

Should dividing the structures external to the

canal fail, the surgeon can then carry his knife deeper, and divide the urethra through the stricture. In doing this, the patient is to be placed in the same position as in lithotomy, and the hands and feet bound together. Chloroform having been administered, a staff or grooved director is passed on to the point of obstruction, and confided to the care of an assistant, who, at the same time, holds up the scrotum. The surgeon then cuts down in the raphé of the perineum to the length of an inch or an inch and a half, and having reached the end of the instrument, he cuts from before backwards freely through the entire strictured portion. This done, he introduces a catheter into the bladder, and which may be allowed to remain for a couple of days, afterwards it may be changed daily. This ought to be steadily persevered in for some time, in order to prevent closure of the passage.

Where the obstruction is confined to the membranous part of the urethra, M. Leroy d'Etiolles advises the incision to be made between the apex of the prostate and the anus, a conical speculum being introduced to dilate the gut. The advantages are, that the surgeon is sure to reach the dilated portion of the canal, that no deep incision is required, no tearing or injuring of the deep cellular texture, and no risk consequently is incurred of urinary infiltration*.

* *Op. cit.*, p. 401.

I believe that Mr. Hunter thought, if he could get behind the stricture, and cut forwards, great advantages would accrue.

Puncture by the Rectum.

Puncture by the rectum is a less difficult operation than that by the perineum. The patient is placed in the same position as for the perineal section. The fore and middle finger of the left hand, previously oiled, are introduced into the rectum, and serve as a guide to the trocar, which is to be carried beyond the prostate gland with its concavity forwards, and made to penetrate the bladder, in the direction of a line drawn from the umbilicus. The stilet is then withdrawn, and the urine evacuated. A flexible catheter may be introduced through the puncture after the withdrawal of the canula, and allowed to remain from twelve to twenty-four hours.

Puncture above the Pubes.

The hypogastric puncture is performed as follows:—The patient being placed horizontally on the edge of the bed, a long curved trocar is carried through the integuments into the bladder, (which, in a distended state, at its fore part, is denuded of peritoneum,) at a point situate about an inch above the pubes in the mesial line, and, in a direction

from above, downwards, and before, backwards. The stilet having been withdrawn, the urine then flows along the canula, which is fixed by tapes in its place.

Comparative Merits of these Operations.

With regard to the merits of these three modes of relieving the bladder, I may observe that the puncture by the rectum affords a ready, easy, and safe operation, which may be performed at any time, and without assistance.

The puncture by the rectum gives immediate relief to all the urgent symptoms, but is merely to be regarded as a palliative means, affording temporary mitigation of suffering. It however gives time and opportunity for future attempts to be made in surmounting the stricture under more favourable circumstances.

For, it is often observed that, when the stress of the urine is taken off from the contracted portion of the canal, or, in other words, the *vis a tergo* removed, the spasmodic irritation and swelling subside, and the surgeon can manage to pass a small bougie, which he had previously failed to accomplish.

Should he not succeed in this desirable object, having the rectal opening as a safety valve, he is in a position to effect one of two things, the removal of the stricture by incision, and the restoration of the natural passage; or the formation of a new and

artificial outlet, whereby the patient may empty his bladder with tolerable comfort for the rest of his life. It cannot be denied that the flow of urine by the gut is attended with more or less inconvenience, and this is only countervailed by the comparative facility and safety of the operation; because there can be no doubt that the artificial opening made through the perineum, although a more difficult and hazardous procedure, is, on the whole, more satisfactory as regards the condition of the patient afterwards.

It is certainly more desirable to have the artificial opening in the perineum than in the rectum. Moreover, the circumstance of opening the urethra just behind the stricture, and in the dilated portion, is a curative step in advance.

The puncture above the pubes, ought, as Mr. Samuel Cooper has judiciously observed, to be resorted to, only in cases, in which the enormous enlargement of the prostate gland, and disease in the rectum, prevent it from being safely made in that part*.

* Surgical Dictionary, Art. "Bladder."

SECTION X.



INCISION OF THE STRICTURE.

I have expressed the opinion, that, if a bougie or other instrument, however small, can be passed into the bladder, as a general rule, the dilatation of the strictured part may be accomplished. This rule, however, is not absolute. Cases every now and then are met with in which the dilatation is impossible, especially in stricture from external injury, and with extensive cartilaginous-like thickening of all the textures. Here there is a constant strain upon the bladder, and the patient's life is rendered a burden from continued pain and uneasiness. Under such circumstances, the Surgeon is justified in resorting to incision, provided there be no serious disease in neighbouring organs. The most eligible procedure in such a case is that recommended by Mr. Syme.

Further, where the stricture is impervious to the most slender instrument, and the patient is worn out with protracted torment, it behoves the surgeon to act with promptitude. Delay is dangerous. The repeated irritation of the bladder, will at length

be communicated, not only to the ureters, but to the kidneys, and the organs in general intended for the secretion and excretion of the urine will become diseased ; and what then will an operation avail ?

A most instructive case, illustrative of the efficacy of incision, has been recorded by Mr. Arnott, in the "Medico-Chirurgical Transactions," for the year 1822. The patient had suffered from a bad stricture for fifteen years, and been under the care of various medical men. No bougie had been passed through the stricture for four years. It had been tried, but unsuccessfully, by a practitioner of eminence, to force an instrument through the stricture twelve months before Mr. Arnott saw him. The attempt was followed by bleeding.

When the patient came under Mr. Arnott's care, he was making water every hour, in drops, and with much straining and pain ; a bougie being introduced, stopped at the bulb. Repeated essays were made to pass even the smallest instruments, but to no purpose : caustic was used without benefit. The stricture being of long standing, the parts were firm and indurated, and the morbid change occupied some extent of the urethra. It was proposed, in consultation, to cut down upon the obstruction. Accordingly, a moderate-sized catheter was passed down to the obstruction, at the bulb. A free external incision was made into the urethra, in front of the obstruction. A small

grooved probe was then guided into the aperture, and pushed on towards the stricture, into which it entered with little difficulty, and was afterwards felt to have attained the bladder. Upon this, a bistoury was run down, and the strictured portion divided. The probe being kept in its place in the urethra, a catheter was directly carried onwards into the bladder. A pint of urine was drawn off, although the patient had thought ten minutes before the operation, he had emptied his bladder. The patient made a good recovery. I have learned from Mr. Arnott that the patient subsequently became the father of a family.

That cases of this kind, requiring incision for their cure, are comparatively rare, may be inferred from the fact, that the above eminent surgeon has never since found occasion to perform the operation in question. His experience is certainly opposed to that of some of the surgeons of the day, who regard every case of obstinate stricture, as alone remediable by perineal section. -

Another mode of incision which deserves a passing notice, is that executed by means of the lancetted stilet introduced along the urethra. It was first fairly brought before the profession by Mr. Stafford, upwards of twenty years ago, but has not been favourably received in this country. However, Dr. Gross, of Louisville, strongly advocates the practice. He says, "When a stricture is
" very old, firm and unyielding, or almost cartila-

“ ginous in its consistence, no mode of dilatation,
“ however judiciously and perseveringly employed
“ can succeed, either alone or in combination with
“ cauterization ; and in such a case I never hesitate
“ to resort at once to incision, satisfied that nothing
“ else will answer. I have repeatedly had, under
“ my charge, patients who had been subjected to
“ the treatment by dilatation for months and
“ months without the slightest benefit, and who
“ were almost instantly relieved by the operation
“ under consideration.” . . . “The instru-
“ ment which I have been in the habit for many
“ years of employing in permeable strictures” . .
“ is called the *lateral bladed stylet*.” . . “For the
“ impassable stricture, a *urethral perforator* is re-
“ quired. This consists of a round graduated
“ silver tube, furnished with a stilet, at one end of
“ which there is a lancet, while at the other there
“ is a handle. Both these instruments, it may
“ now be added, may be either straight or curved,
“ according to the site of the stricture.”

“ The conical extremity of the instrument being
“ securely engaged in the contracted part, the
“ penis is drawn forwards, and the lancet pressed
“ steadily against the resisting surface, until it is
“ completely divided at two, three, or more points
“ of its circumference.

“ For a stricture of the membranous portion of
“ the urethra, the most suitable instrument is a
“ curved perforator, used upon the same principle

“ as the lateral bladed stylet, but with a degree of
“ caution, the greater as this part of the canal is
“ more intricate in its relations and directions. In
“ whatever manner the operation is performed, the
“ moment it is over a metallic catheter is passed
“ into the bladder, and retained there either per-
“ manently, or a few hours every day, until the
“ urethra has regained its natural diameter*.”

While treating of incision, it may be stated that stricture at the meatus, or orifice of the urethra, yields most readily to this means. In short, it is the suitable practice. A narrow blunt-pointed bistoury answers the purpose very well.

Scarification has been resorted to by some continental surgeons for curing stricture. I have no experience of the practice, yet conceive that, if properly directed, it may occasionally prove serviceable, on the same principle that relief is obtained, in some morbid states of the mucous membrane of the rectum, from superficial incisions. Here it not merely unloads the vessels of the part, but also sets up a new and more healthy action in them. For information respecting the various modes of scarifying the urethra, I refer the reader to the writings of Mons. Leroy d'Etiolles.

In what may be called hopeless cases, that is, where the whole extent of the bulbous and membranous portions are nearly obliterated, where the prostate, bladder, and kidneys are diseased, relief

* Gross on the Urinary Organs, p. 647.

may be obtained from the use of anodynes—warm bathing and proper attention to the bowels—washing out the rectum with tepid or even cold water is beneficial; because feculent matter, if allowed to lodge in this gut, becomes hard and dry from the moisture being absorbed, and consequently a source of irritation. It also does harm by preventing the return of blood from the hemorrhoidal vessels. The patient ought to be told to go to stool at night, and, by persevering, will soon acquire the habit of doing so. The diet ought to be mild and nutritious. All stimulants of the renal secretion should be avoided. The patient ought to be confined, in a great measure, to the horizontal position, so as to prevent as much as possible the accumulation of blood in the pelvic veins, which, in consequence of the absence of valves in the portal system, is invariably increased by the erect posture. Congestion here, always adds to the distress.

SECTION XL.



AFFECTIONS OF THE PROSTATE.

The prostate gland is prone to hypertrophy at the critical period of life, when the blood-vessels begin to lose their elasticity, and become crisp from the deposition of earthy phosphates, and when the other changes incidental to declining years begin to show themselves. It generally enlarges upwards in the bladder, and inwards, carrying the coats of the bladder before it. In this way, the course of the urethra is considerably modified, for we have on the one hand, the prostatic portion altered in length, which, in its turn, draws up and elongates the membranous portion; while on the other, we have an antagonist influence exercised by the action of the perineal muscles. When this enlargement occurs in consequence of, or in connection with stricture of the urethra, it forms a very serious complication. Here the catheter, and the catheter alone is the main-stay, on which the surgeon must rely. The bougie is of no use. For this purpose, the catheter ought to have a suitable length and curve. Indeed, the surgeon ought to be provided

with an assortment of different lengths and curves, adapted to each individual case. I prefer one made of silver, taking care to have the eyelets nicely rounded off. The smaller the catheter, the more necessity to have it well made and strong. Sometimes, instead of having a single slit or eyelet, it is better to have the extremity of the instrument pierced with several apertures. If the catheter can be properly introduced, the patient will derive great relief from its use, and the progress of the disease will be retarded, by the abatement of irritation.

The circumstance of the urine dribbling away, is to be viewed as an indication for its employment, inasmuch as the bladder may be greatly distended whilst the dribbling continues.

Should the enlargement of the prostate, cause an insuperable difficulty to the introduction of the catheter, the beak of the instrument may be made to perforate the middle lobe of the gland. A silver catheter, conical at the point, will answer the purpose. In performing this operation, great care must be taken to keep the instrument in the middle line, avoiding on the one hand the arch of the pubes, on the other the rectum. Under such circumstances, this plan is preferable to that of puncturing the bladder.

Where there is tenderness felt in the region of the diseased prostate, it will be right to apply leeches ; indeed, I believe that much good is done

in many cases of the kind by occasional local depletion as a means of checking the progress of the malady.

A gentleman, about thirty-two years of age, applied to me on account of a pain and feeling of weight he had in the rectum, which he attributed to piles, together with some difficulty in voiding urine. On examination, I found the prostate considerably swollen and tender to the touch. His urethra was very irritable; he had been much troubled with urethral discharge, and with gonorrhoeal affections of the joints and eyes. He had been afflicted at times with spasmodic stricture. His bowels were habitually confined. By the occasional use of the catheter, injections of salt and water into the rectum, the application of leeches, rest in the recumbent position, and other suitable means, the swelling of the prostate entirely subsided.

Acute inflammatory swelling of the prostate gland, sometimes ending in abscess, is a more frequent result of callous and contracted stricture, than the chronic enlargement. Subjoined is a case of this nature:—

A married man, about forty-two or forty-three years of age, came under my care in January 1850. He had suffered from occasional difficulty in voiding urine, which he ascribed to stricture, and more especially during the autumn of 1849. For some time, he was under treatment by bougies, without deriving any benefit, when his health began to fail,

and he looked sallow and much out of health. He had increased difficulty with frequent desire to void his urine, and pain at times severe and lancinating in the fundament. He passed but a small quantity of urine at once, and that was bloody and offensive. He had considerable swelling of the belly, attended with pain from distended bladder; and also pain and weariness referred to the loins. On examination of the rectum, a large tumour of the prostate was felt, which was very tender to the touch.

A fortnight elapsed, before any instrument could be carried through the contracted membranous part of the canal, and afterwards much patience and care were necessary to pass it into the bladder, owing to the obstruction caused by the swollen condition of the prostate. When this was effected, a chamber-potful of dark-coloured grumous offensive urine, containing a large amount of puriform matter, was drawn off. During ten days subsequently, the urine had to be drawn off every eight hours, otherwise the pain became very severe. His health now began to amend—the urine became clear and free from blood. After the above period, the catheter was used twice daily. At the end of six weeks, he was comparatively well, free from pain, and had gained flesh, pursuing his ordinary avocations, and passing the catheter himself. The bladder did not regain its power.

In this case, the passing of the catheter was always attended with much pain and violent spasm

at the commencement of the treatment, so that I was obliged to pause for five or ten minutes, until the spasm went off; this was no doubt owing to the inflammatory condition of the prostate, which ended, as stated, in suppuration.

A very interesting and instructive case, showing the distress caused by prostatic abscess from neglected stricture, is that of a friend of mine, a distinguished Medical Officer in the army. This gentleman, now sixty-six years of age, had stricture in 1809, which caused him to dismount from his horse every three or four hours, in order to relieve his bladder. He had previously been afflicted on several occasions with gonorrhœa. At the above period he was exposed to all the vicissitudes of a soldier's life during campaign, and unable to profit by treatment, until his return to England in 1814. At this time, a small white bougie was passed, with some difficulty, and which afforded relief. In 1815, he was called to Waterloo, and remained on the Continent till 1818 with the Army of Occupation; all this while, no proper attention was paid to the stricture. He was voiding urine every four hours, both night and day, and had gleety discharge from the urethra. On returning to England, he was in the habit of passing occasionally a small bougie until the year 1827, when he married. Invariably, after passing the instrument he had a shivering fit, resembling ague, which compelled him to desist; all this time, he was voiding his urine without

uneasiness, but in a small stream, and on an average every three or four hours. Thus he went on with tolerable comfort, until the summer of the year 1831, when one night, while relieving his bowels, he felt a strong inclination to pass urine, but none came away till half-an-hour had elapsed and after much straining. On the following morning, he had violent rigor, the forerunner of an attack of continued fever, which lasted about three weeks. For the first three days he voided urine as usual, but about the third day, he was surprised at perceiving a quantity of fœtid matter in the chamber-pot, after having swallowed a dose of castor oil to empty his bowels. This continued to pour away during several days, inducing great debility. He was now convinced that an abscess had formed in the prostate gland, and had burst into the urethra, in consequence of the peculiar, heavy and distressing pain in the rectum. The pain became agonizing during defecation, and the only mitigation he had, was, by sitting in hot water, as hot as he could bear it. He experienced no pain in voiding urine. This state of things continued for about ten days, during the whole of which time, he was passing a quantity of matter. The distressing symptoms then gradually subsided, and his constitution rallied under the use of port wine, quinine, and the like. He had no other inconvenience, save the necessity for voiding urine every three or four hours. The dread of rigors deterred him from having recourse to the

bougie. In the year 1835, he went to Spain, where he was much exposed to inclemency of weather, and underwent great mental and bodily fatigue. His ailment did not trouble him to any extent, till the month of March 1837, when one morning without any apparent cause he found himself unable to discharge his urine; but obtained relief after remaining three quarters of an hour in a warm bath. Being alarmed, he requested a surgeon to pass a bougie, but after the second introduction rigors supervened, followed by an attack of continued fever, which reduced him to such a state of emaciation and weakness, that he had to be carried on board the vessel which was to convey him to England, where he arrived in June 1837. Nothing further was done till the year 1840. At this period he suffered from increased distress in the bladder, was passing from one to two ounces of urine almost every hour, and that not without considerable difficulty.

A surgeon now made an unsuccessful attempt to pass a bougie: in six hours afterwards, the dreadful rigor came on, which was followed by several others. This weakened him so much, that he had scarcely power to lift his head from the pillow; he was sustained by strong soups, and by large doses of morphia to quiet the system. At this juncture, he called in the aid of a distinguished surgeon, who made a fruitless attempt to pass an instrument, and said, "Notwithstanding the fearful state you

“ are in, unless we can succeed in getting in a
“ catheter, which must be attempted at all costs,
“ we cannot go on.” He then tried for some time,
but in vain, and remarked, “ We will now wait till
“ to-morrow: go on with the morphia to allay the
“ irritability, and continue the use of the strong
“ soups.” At his visit next day, he said with some
anxiety, “ We will now do what we can to get in
“ the catheter, but you must not be disappointed
“ if we do not succeed.” About an hour previously,
the patient, on making an effort to expel his urine,
was much surprised to find, that about a table-
spoonful of very offensive purulent matter issued
from the penis. The surgeon being told of this
said, “ It may assist us; where can it come from?”
He then made an attempt to pass a small-sized
gum catheter with a stilet, and fortunately, after
about ten minutes, by employing great tact and
management but no force, succeeded in getting
it into the bladder, and allowed it to remain for
ten days. Hereupon, all the distress vanished.
The urine, which was let off by the catheter every
five or six hours, became natural, his appetite
returned, and with it health and strength. Sub-
sequently, the patient used the catheter daily, in
consequence of the bladder having lost its power,
and continued doing so till March 1851; when on
jumping out of bed as usual to draw off his urine,
he was surprised to find, before he could get the
catheter ready or reach the chamber-pot, the urine

flowing out in a stream without pain or straining. It continued to flow uninterruptedly till his bladder was relieved, the same amount being evacuated as would have been drawn off with the catheter.

This occurred again in the course of an hour, since which he has been able to pass urine without the catheter. Nevertheless, he has deemed it expedient occasionally to introduce it.

For a month previously, he had been taking a dose of opium every night, and infusion of bark with dilute nitric acid, three times a day.

I may add, that the patient now voids urine with more ease, than he has done for the last forty years. His bladder is much more retentive than formerly, although apparently sacculated, as may be inferred from the state of the urine, which is alkaline and ammoniacal, containing pus corpuscles, phosphates, and occasionally blood. I believe the opium to have been of great service here.

The above case, which I have given at great length on account of its practical importance, carries its own commentary. Above all, it exhibits the serious consequences which arise from neglecting the early symptoms of stricture.

The following, from the *Post Mortem* records of St. George's Hospital, will serve to illustrate this point:—

W. R., *æt.* 50, was seventeen days in the Hospital. There were two abscesses in the perineum, on the left side; one situate and opening externally

through the bag of the scrotum; the other was posterior to this. They both communicated with the membranous portion of the urethra, which was perforated by ulceration in three or four places. The stricture was situate just at the junction of the bulbous with the membranous portion of the canal, and a probe could be passed only with great difficulty. The bladder was much thickened and enlarged, and its mucous surface much discoloured. The kidneys were lobulated, and presented traces both of capsular inflammation and of internal degeneration: they were of small size. The liver was very large, and the gall bladder enormously distended with calculi.

W. W., *æt.* 62, was twelve days in the Hospital. The kidneys were very large, soft, and of a dark purple colour, mixed with numerous spots of yellow. The tissue of these organs gave way easily when pressed upon. The yellow spots, when cut into, presented the appearance of lymph and pus. The calices, infundibula, and pelves, were much dilated; the mucous membrane was of a dark colour. The ureters were much enlarged.

The coats of the bladder were very much thickened. In the interior it was fasciculated, and presented two sacculi, formed by the protrusion of the mucous membrane through the muscular fibres; one of these, situate at the apex of the bladder, had given way, and a small quantity of urine had apparently escaped into the cavity of the peritoneum.

The prostate gland was not much affected.

The mucous membrane of the posterior part of the membranous portion of the urethra presented a small ulcerated opening, leading down into an abscess. The pus contained in this cavity had made its way anteriorly, passing under the membranous part of the urethra, and had opened in the fore-part of the perineum; posteriorly this abscess communicated with the rectum, just above the internal sphincter.

There was stricture at the membranous part of the urethra.

The peritoneum presented evident traces of inflammation.

There was effusion of serum under the arachnoid membrane. The ventricles of the brain were much enlarged and distended with fluid.

H. B., *æt.* 53, was eleven days in the Hospital. There was general emaciation to a great extent.

Both kidneys were distended to one-third more than their natural size, and deficient in weight by one-third. The pelves and ureters were greatly dilated; and the lining membrane of the pelvis and infundibula of the left kidney were bathed in pus of a very fœtid description.

The bladder was large and reticulated; about six lines in thickness. There was a small suppurating cavity in the middle of the prostate; a small urinary abscess behind the bulb and seat of stricture. This part of the urethra was extensively

ulcerated. The stricture, situate about one inch and a half anterior to the bulb, was so constituted that there was just room for a very fine probe to pass through the canal. The parieties and surrounding textures were very dense and gristly.

A false passage was found, leading from the portion of the urethra anterior to the stricture, passing on the left side of it, and communicating behind it with the urinary abscess, or rather the ulcerated portion of the urethra behind the stricture. Pus had been discharged by the natural passage during life.

SECTION XII.

FISTULOUS OPENINGS IN THE
PERINEUM,

which are the consequence of disease of the neck of the bladder and urethra, require particular consideration.

“ In these,” says Mr. Pott, “ the external openings, with the sinuses leading from them into the cellular membrane, are the least part of the complaint; the stricture in the urethra, the induration of the whole neck of the bladder, the hardened, fungous, enlarged or ulcerated state of the prostate gland; the diseases of the *verumontanum*, of the *vesiculæ seminales* and *vasa deferentia*, are the great and principal objects of consideration.”

If the fistula depend on stricture, that must be removed by the means already pointed out. After this, a full-sized bougie-catheter is to be introduced, into the bladder, and retained for some time. The object of this is to lead the stream of urine by its natural channel, and thus prevent the irritation which tends to prevent the sinus from closing. The

instrument ought to be of such a size as will not permit any urine to flow by its sides, otherwise it is useless. The healing of the sinus may be further promoted by stimulant injections, consisting of solutions of sulphate of zinc, nitrate of silver, and the like. In some intractable cases, resort must be had to incision, and the safest plan for this purpose is to divide the callous structure on a grooved director.

Where, in addition to the sinus or sinuses, we find a hard swelling in the perineum, caused by consolidation of effused lymph, an incision may be made through the indurated textures down to the urethra, and immediately afterwards a catheter should be introduced along the canal.

Abscess in the Perineum.

It has been already stated that, when the parts behind the stricture inflame, either sloughing or ulceration may ensue, when the urine will escape under the fascia; and the cellular texture, becoming the seat of an abscess, may open into the urethra; or, from the influence of the urine and the continued pressure of the abdominal muscles, the coats of the abscess itself may give way, and the urine be thus extravasated into the adjacent parts.

The imperative rule here is to open the abscess early. If this be not attended to, the consequences

may be fatal. The case is to be subsequently treated as one of fistula in perineo.

A patient came under my care, while I was House Surgeon at the Lock Hospital. He had suffered severely from stricture, ulceration took place behind the stricture, urine insinuated itself into the cellular tissue, and a deep-seated abscess formed in the perineum. The patient experienced all the symptoms of putrid abscess in that situation, and had not passed urine by the natural passage for several hours. He seemed in a state of insensibility from pent-up putrid matter and gas. I made a large, free incision, deep into the perineum, and gave exit to a quantity of very offensive matter and urine. On introducing my finger, and carefully dilating the wound, and placing a catheter in the urethra at the same time, I could feel the breach or opening in the urethra. The catheter was next conducted into the bladder. By the above treatment, and supporting the patient's strength, the opening in the perineum closed, and the urethra was restored to a healthy condition, without any untoward symptom. In this case, doubtless, the ulceration of the parts behind the stricture had extended to the stricture, and destroyed it, a very fortunate thing for the patient.

Catarrh of the Bladder.

The most frequent affection of the bladder, which

is met with as a sequel of stricture, is catarrh with hypertrophy. This is characterised by an inordinate flow of thick ropy mucus. For the treatment of this disease, a variety of remedies have been proposed ; viz., copaiba, in small doses, pariera brava, buchu, uva ursi, &c. &c. Most relief, however, will be obtained from the use of anodynes, and the occasional irrigation of the bladder with a stream of tepid water introduced through a catheter*. Medicated injections have now and then been found beneficial, as for example, those holding solutions of the extract of opium and nitrate of silver. In employing the latter substance, it will be right to commence with a very dilute solution, and throw in only an ounce or two at a time. For this purpose, a common catheter is to be used. Where the urine is very alkaline and

* A man, aged fifty-seven, came under my care in the year 1838. He had suffered from stricture for twenty years. He complained of scalding in the urethra, with desire to void urine every ten minutes, and great difficulty in passing any. In fact, it only came away in drops, generally mixed with blood and matter ; it had an offensive ammoniacal odour, and was very acrid. He had severe pain above the pubes, in the abdomen, right breast, in the region of the kidneys, and occasionally between the shoulders. No instrument had been attempted to be passed for six years. I commenced the treatment by introducing small wax bougies, applying leeches to the perineum, and prescribing effervescing salines, and enjoining rest. I subsequently passed a silver catheter and injected the bladder with warm water. After this he rapidly improved in all respects.

ammoniacal, the irrigation of the bladder with pure tepid water ought to precede the employment of the medicated injection.

In the early stage of vesical disease, I am confident that much benefit will be derived from the judicious employment of the catheter. It will prevent the bladder being over-wrought, and tend to counteract that venous congestion in adjacent parts, which is produced by distension of that organ.

SECTION XIII.



AFFECTIONS OF THE TESTICLE.

Inflammation of this organ supervening upon stricture, must be combated according to the principles of treatment laid down by writers on surgery. If the patient be plethoric, blood-letting should be practised; otherwise leeches may be applied to the part, followed by hot fomentations. The patient is to be confined to the recumbent posture. Saline medicines, with antimonials, may be exhibited during the day, and small doses of mercury, combined with James's powder and henbane, given at night. In severe cases, calomel, with opium, will be indicated. The diet, of course, should be light and soothing. During convalescence, and for some time afterwards, a suspensory bandage ought to be worn, and all violent exercise of the body strenuously interdicted. As soon as the patient is thoroughly recovered, attention should be directed to the removal of the stricture. The surgeon ought likewise to examine carefully, if possible, the prostatic portion of the canal, for, in these cases, the urine is liable to be delayed there,

and becoming mixed with the secretions of the part, act as an irritant to the ejaculatory ducts. If such be the case, advantage will be gained from the use of the catheter, which will not merely serve to dilate the canal, but likewise to afford egress for the pent-up urine and other fluids.

Very serious consequences may arise from neglect, as the following instance proves :—

A tailor, aged sixty, of spare habit, married, and the father of five children, had suffered from difficulty in voiding urine during two years, without having any medical advice. All of a sudden he was attacked with inflammation of the testicles, which became enormously swollen, hot, and painful. A surgeon in the neighbourhood, who was called at this time, found him complaining of excruciating pain and difficulty in attempting to evacuate his urine, which came away only by drops. Relief was obtained by the application of leeches, followed by calomel with opium and purgatives. About a week afterwards, he had a shivering fit, succeeded by pain in the left testicle. On examination, a small ulcer, of a very unhealthy aspect, was observed ; a free incision gave exit to a quantity of very offensive matter. In spite of all that could be done, sloughing ensued, and the testicle came away a dead mass, without pain or hemorrhage. The wound soon healed. Shortly after, I was requested to see him in reference to the stricture, for although he could void urine better than for-

merly, not even the smallest instrument could be passed into the bladder. I ascertained that there was a bad stricture at the bulb, and another in the membranous part of the urethra. The latter, I took by storm, if I may be allowed the expression, and left a small gum catheter in the bladder. Before long, I was able to pass a No. 9 instrument. The strictures were thus cured, and the bladder, which was becoming affected, was restored to its natural condition.

I might adduce two instances that came under my notice, in which prolonged irritation of the prostatic portion of the urethra, was the forerunner of malignant disease of the testicle, but refrain from doing so, because neither of the patients had stricture.

ON MORBID IRRITABILITY OF THE URETHRA.

In connexion with the subject of stricture, I feel I ought to offer a few remarks on what may be termed morbid irritability of the canal of the urethra. This condition is commonly marked by symptoms of chronic inflammation. There is generally more or less uneasiness, sometimes amounting to pain, in one part or other of the urethra, a difficulty in voiding urine, with a discharge of a puriform character. The history generally given by the patient in such a case is,

that the urethra has been out of order for some time ; that he has had gonorrhœa repeatedly, some of the attacks attended with much inconvenience, and the inflammatory symptoms unusually protracted.

In these cases, there is generally a congested state of the vessels of the back part of the canal that is in the vicinity of the membranous portion and the bulb, together with a puffy, tumid condition of the lining membrane, by reason of which the discharge does not escape readily, but is pent up in the longitudinal furrows or valvules which are met with in the membranous and bulbous parts of the canal. This lodgment of matter is a source of annoyance to the patient, more particularly when rendered acrid from admixture with urine.

The practice I have found most beneficial under such circumstances, is to introduce a bougie a few times, or allow a small gum catheter to remain in the canal for a short while. After the instrument has been passed a few times, the patient voids urine with greater ease, the discharge diminishes, and he feels generally more comfortable than previously. The instrument when first introduced usually meets with some impediment in its course, and often occasions slight bleeding, although the utmost gentleness be employed. Where this treatment is unsuccessful, the surgeon may suspect that the malady is of constitutional origin. Thus, many instances of troublesome intermittent discharge,

described by French writers as *gonorrhée à répétition*, are connected with a rheumatic or gouty diathesis, and must be dealt with accordingly.

The only topical remedies admissible under such circumstances are those of a mild and soothing nature.

I recollect the case of a gentleman who had been under treatment for a slight discharge from the urethra. Bougies had been used, in conjunction with the administration of irritant medicines. I found some inflammation and slight thickening at the back part of the urethra, recommended the use of the bougie to be discontinued, and substituted for the copaiba and other stimulating drugs, simply alterative means. The result was a subsidence of the ailment.

Again, I have met with many cases of purulent discharge, confined to the front part of the urethra, and attended with a pouting irritable state of the orifice, and which patients have told me has annoyed them for months, and for which they have taken internal medicines until the stomach has been perfectly nauseated. This form of discharge is in numerous instances kept up by the constant friction of the lips of the urethra against the clothes, there being an entire or partial paraphymosis, the prepuce being short and the glans denuded.

By merely shielding the orifice, the discharge will frequently cease in eight or ten days. If the foreskin be shorter than usual a slip of adhesive plaster

will act as an efficient covering ; where the glans is completely bare, it will be advisable to apply a bit of lint smeared over with some bland salve ; as for example,—one composed of cold cream, with the addition of a little powdered opium and solution of diacetate of lead.

Finis.

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APPENDIX.



PLATES,

ILLUSTRATING SOME OF THE CHIEF POINTS WHICH HAVE BEEN
ALLUDED TO IN THE PRECEDING PAGES.

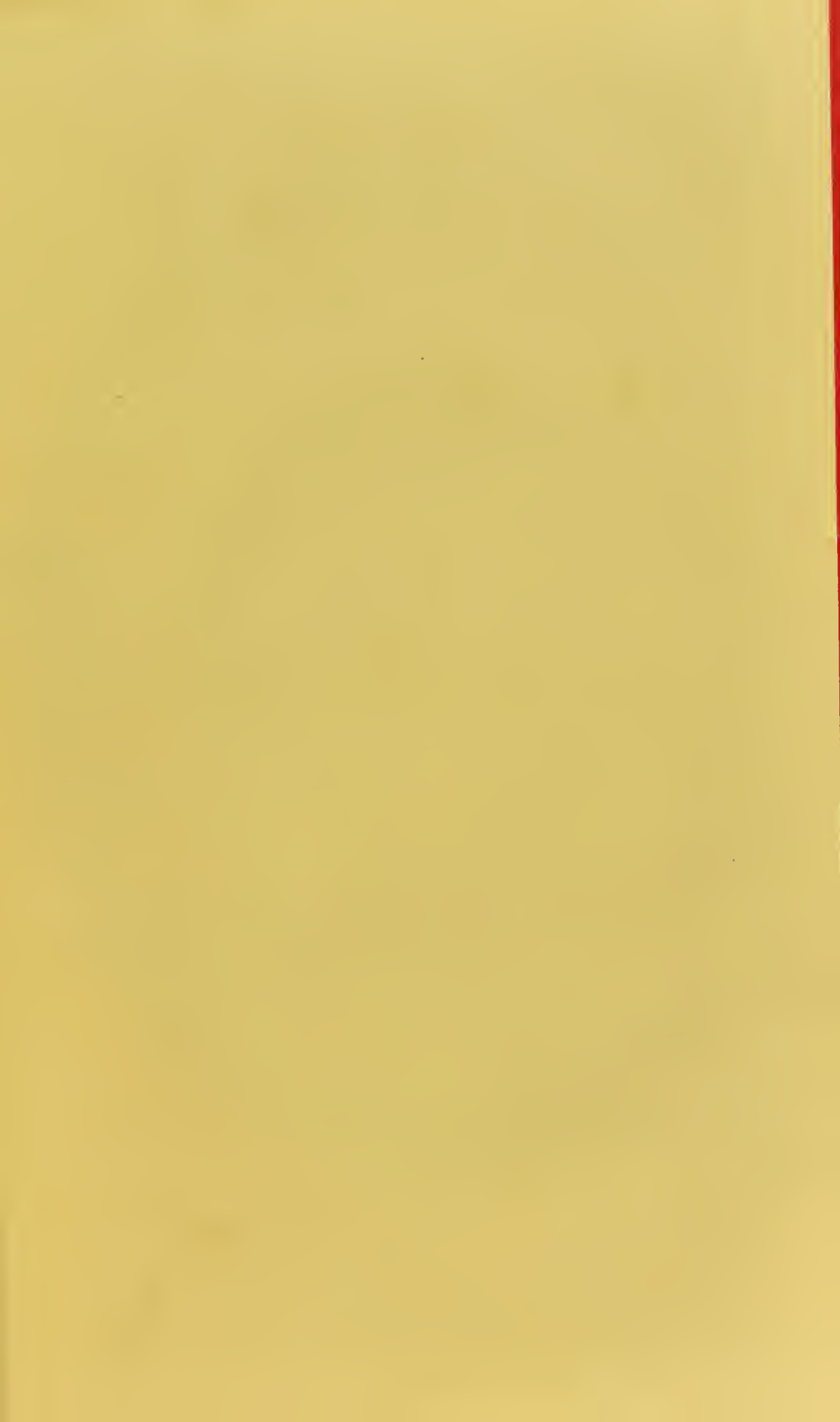


PLATE I.



PLATE I.

The urinary bladder and urethra, from an anatomical preparation of the parts, removed after death. This drawing exhibits several of the chief characters and effects of urethral stricture.

The stricture (*a*) is situate about an inch anterior to the bulb. It is produced by a dense fibrous structure beneath the mucous membrane, which, having gradually formed in the inferior and lateral walls of the urethra, has so nearly closed the canal, that it will only admit the passage of a bristle. The portion of the urethra anterior to the stricture appears healthy; that which is behind the stricture is dilated, and its walls are thickened. This dilatation, with thickening of the walls, continues to the commencement of the membranous part of the urethra (*b*), where the canal is again slightly narrowed, yet not abruptly, nor with any evident change of structure. The prostatic part of the urethra appears healthy.

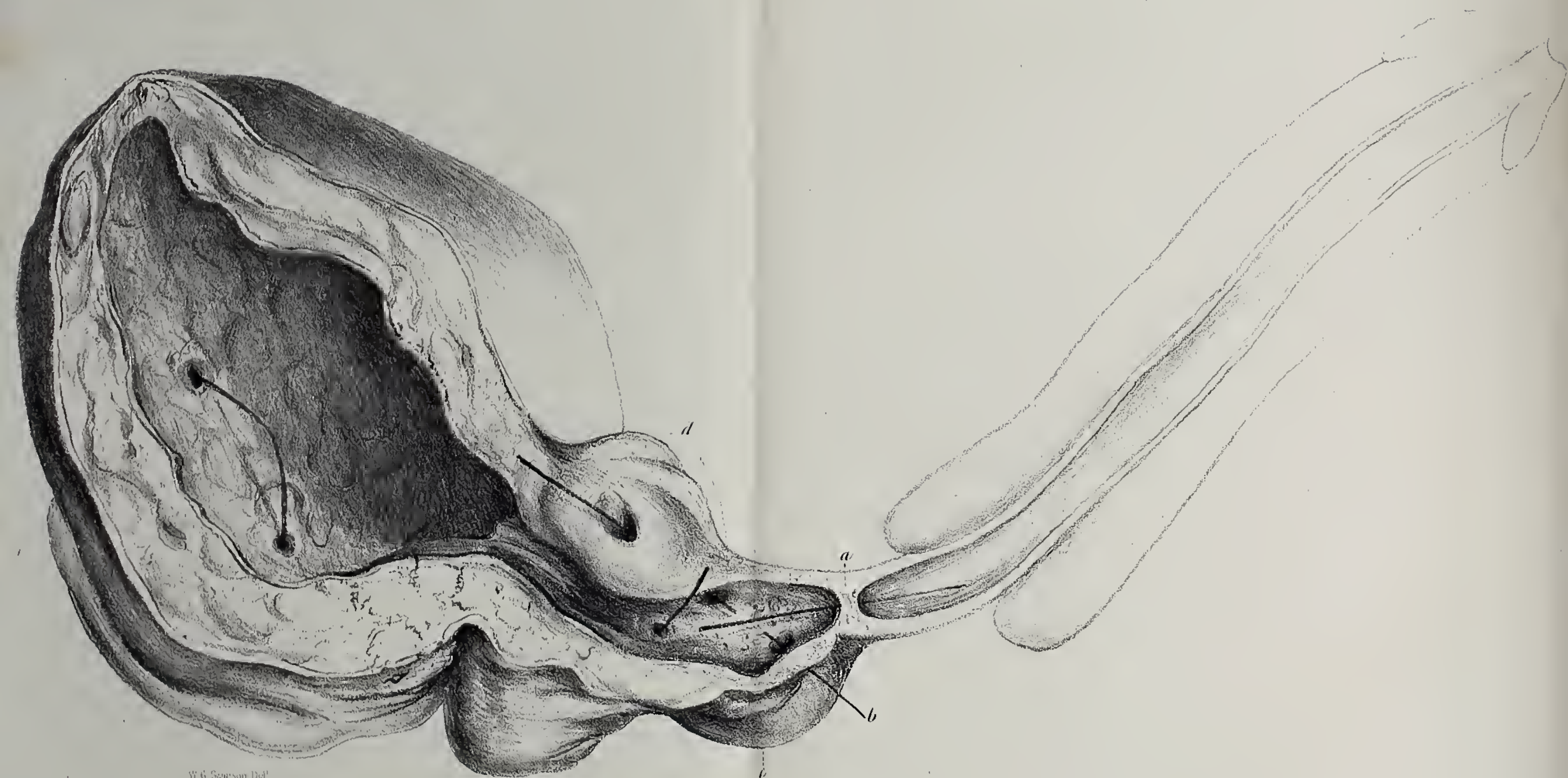
The bladder is greatly dilated. Its walls are thin in proportion to its capacity, and strong interlacing bands of muscular fibres project on its internal surface; between these, the mucous membrane is deeply depressed. In two places on the outside, the mucous membrane is dilated beyond the muscular coat in sacculi, like herniæ. This,

although distinctly visible in the preparation, cannot be shown in the drawing.

The prostate gland is enlarged, but without projecting either into the bladder or the urethra. In its right lobe is a small cavity (*c*), the remains of an abscess, and around this, many of its ducts appear dilated.



PLATE 2.



W. G. Searson Del.

PLATE II.



Exhibits the state of an urinary bladder and urethra with stricture, very similar, in its general character, to that shown in the preceding plate.

In this, the stricture is situate in the bulbous portion of the canal, at (*a*). Behind the stricture, the membranous part of the urethra (which is unusually short) is dilated; its walls are thickened, indurated, and blended with the adjacent tissues; its mucous membrane is roughened, by superficial ulceration and deposit of lymph. A small fistulous passage (*b*), commencing immediately behind the stricture, extends obliquely forwards, through the substance of the bulb (*c*). In its further course it has extended through the perineum, and opened externally. The prostatic part of the urethra here appears healthy, except that it presents an aperture, through which, an abscess in the prostate gland has opened into it (*d*).

The bladder is small and contracted. Its walls are very thick from hypertrophy of its muscular coat, between some

of the fibres of which, two small portions of the mucous membrane are pushed out in saceuli.

The bladder, in this case, was found full of pus; and the apertures, where bristles are represented as being introduced, communicated with the bladder and contained the same fluid.



FIG. 1.



a. Verumontanum or caput gallilaginis. b. Simus Pocularis.
c. Ejaculatory Ducts. d d d d d. Ducts of the Prostate

FIG. 2.



Longitudinal Columns or Folds of the Urethra, shewing the
Vascularity of the Valliculæ.

PLATE III.



Fig. 1.—Exhibits the appearance of the mucous membrane of the prostatic portion of the urethra, commencing a little anterior to the neck of the bladder.

Taken from a preparation, magnified eight diameters.

It also shows the *verumontanum* or *caput gallilaginis* (*a*) ; (*b*) the *sinus pocularis* ; and the orifices of the ejaculatory and prostatic ducts.

Fig. 2.—View of the mucous membrane of the urethra, about three quarters of an inch anterior to the bulb—magnified nine diameters—showing the longitudinal columns or folds of the urethra, and the vascularity of the valliculæ.

PLATE IV.

Fig. 1.—A lateral section of the pelvis—showing the relative positions of the bladder—rectum—prostate gland—membranous part of the urethra, with Wilson's muscle—the bulb, &c.

- a.* The bladder.
- b.* The rectum.
- c.* Prostate gland.
- d.* Membranous part of the urethra, with
Wilson's muscle.
- e.* Bulb.
- f.* Part of the levator ani.
- g.* Vesicula seminalis.
- h.* Vas deferens.

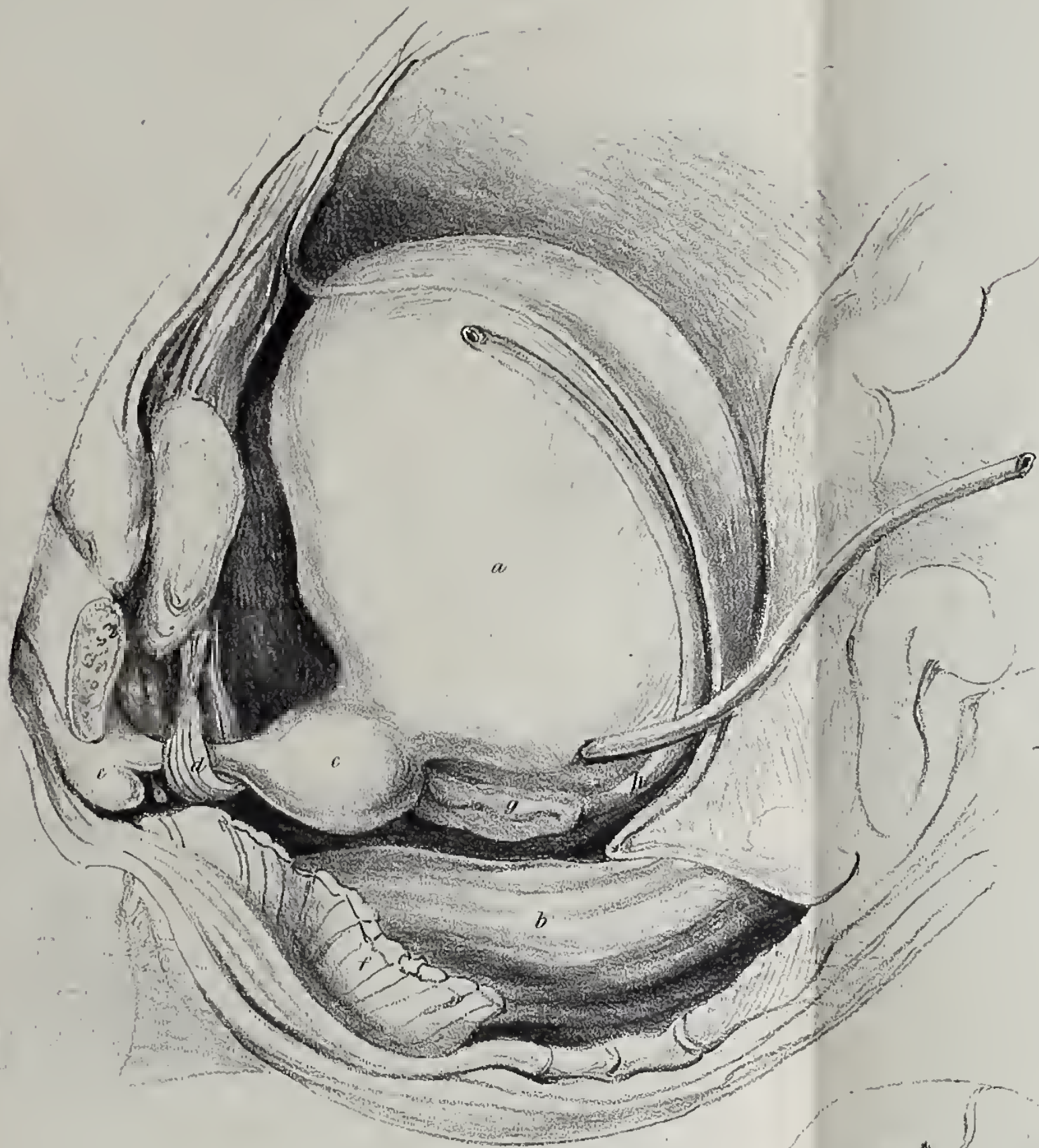
Fig. 2.—Is a front view of the perineal muscles—showing the accelerator urinæ, with its fibres diverging anteriorly.

- a.* Accelerator urinæ.
- b.* Transverse muscles of the perineum.
- c.* Erector penis.
- d.* Levator ani.
- e.* Sphincter externus ani.

Fig. 3.—Bladder—prostate—membranous part of urethra and bulb—vesiculæ seminales—and vasa deferentia.



FIG. 1.



- a.* Accelerator urinae.
- b.* Transverse muscles of the Perineum.
- c.* Erector Penis.
- d.* Levator ani.

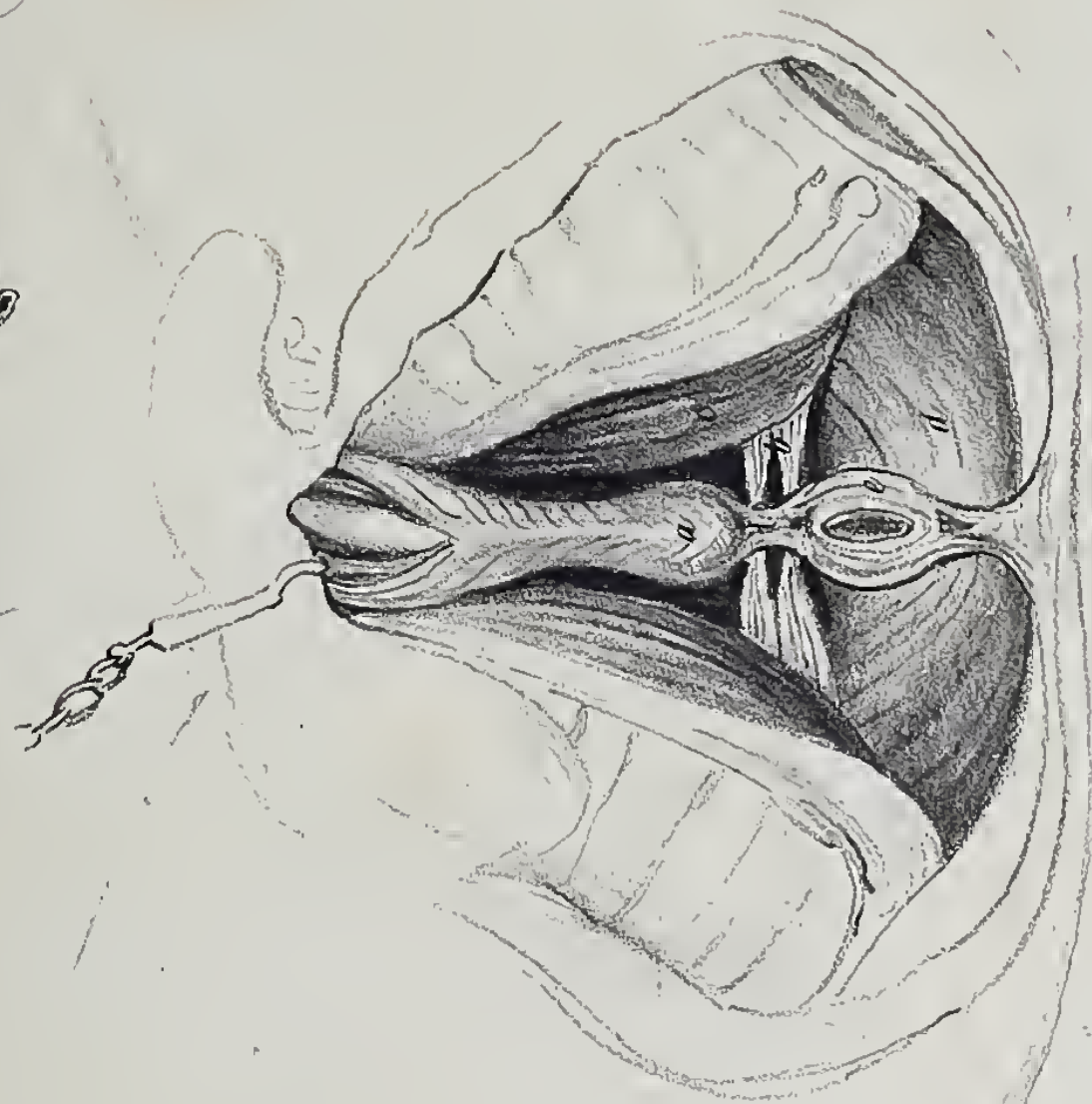


FIG. 2.

FIG. 3.



- a.* Bladder
- b.* Prostate
- c.* Membranous Part of Urethra.
- d.* Bulb.
- e.* Vesiculae seminales and vasa deferentia.

